

THE
PRACTICAL
PRINTER
HEARN.

Note missing both
sides fly not.

Turner's belly not

W H packham whose
book you want bought -

Wm. H. Jackson
Washington
D.C.

1875.

2-24-32

W. H. Jackson. in the office this
morning. I regret I did not show
him this book -
G. J. Olmsted Jr.
He is 90 in April -

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F. GUTEKUNST,

PHILADELPHIA.

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THE

PRACTICAL PRINTER.

A COMPLETE MANUAL

OF

PHOTOGRAPHIC PRINTING.

BY

CHARLES W. HEARN.

CONTAINING FULL DETAILS CONCERNING ALL THE STYLES AND
PROCESSES OF PLAIN AND ALBUMEN PAPER PRINTING
AND OF PRINTING ON PORCELAIN,

WITH

An Example of Printing by the Author,

AND NEARLY ONE HUNDRED ILLUSTRATIONS,

VALUABLE TO BOTH THE LEARNER AND THE PRACTICED PRINTER.



PHILADELPHIA:
BENERMAN & WILSON.

1874.

Entered according to Act of Congress, in the year 1874,

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In the Office of the Librarian of Congress, at Washington, D. C.



PHILADELPHIA :

SHERMAN & CO., PRINTERS.

Phot.

W. H. Jackson

PREFACE.

IN the preparation of this work it has been the aim of the author to make it of *practical value* to those who are about to commence the study of photographic printing, or those who desire to perfect themselves in it, and for this purpose he has endeavored to place in it only such information and advice as can be relied upon, and which will aid the learner in acquiring speedily the *modus operandi* of general Albumen, Plain Paper, and Porcelain Printing.

The writer has purposely, in many chapters of this work, treated of cases which are not very often found in the majority of galleries, yet, as they are in a few, they have for that reason been taken up and disposed of.

All of the different classes of negatives mentioned have been real ones with the author, and not imaginary, for they have all at some past time been given to him to print from, and have been "doctored," printed, etc., by some of the methods mentioned.

It is not the printing from excellent negatives that teaches the learner, for fine prints from such are very easily obtained; but it is the printing from poor negatives that instructs him, and it is on this account that many printers in poor galleries often understand best the printing of difficult negatives, because they are more accustomed to print from such.

The elegant specimen of photography embellishing this work is from the well-known photograph gallery of Mr. F. Gutekunst, of Philadelphia, Pa., whose establishment is probably one of the most complete in the world. On making known to Mr. Gutekunst our desire to print the photographs, partly illustrative of this work, at

his gallery, he very kindly permitted us to do so, and we here with pleasure present the same to our readers.

The prints were printed, and burnished on Entekin's Oscillating Enameller, by the author, but the management of the silvering and toning baths was conducted by the gentleman who attends to that part of this branch of the art, viz., Mr. Henry C. Bridle, lately from England, and we congratulate him in having presented us with such fine tones as he has done. The formulæ by which these prints were produced, kindly given to us by Mr. Bridle, are as follows :

Silver Bath.—Silver, 40 to 45 grains (according to temperature) ; nitrate of ammonia, 20 grains ; distilled or ice water, 1 ounce. Float from forty-five seconds to one minute.

Toning Bath.—Solution chloride of gold, made slightly alkaline with bicarbonate of soda, according to the usual formulæ for carbonate of soda toning baths. Tone a little purple.

Fixing Bath.—Hyposulphite of soda, 1 part to 8 of water, and if the paper blisters in the washing soak the prints for five minutes in a solution of common salt.

Hoping that you will find this work profitable to you, I remain,

Yours fraternally,

CHARLES W. HEARN.

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THE PRACTICAL PRINTER.

INTRODUCTION.

THE PRINTING-ROOM.

FOR good success at printing, it is necessary that the printing-room should be convenient to work in, and well supplied with those materials, &c., which are so necessary for fine work.

A good printer, like a good surgeon, may do very well with a few conveniences, but he will more likely do better with more. A good draughtsman may do very well with his pen and parallel-rulers, but he can do much better by the use of a set of instruments, and that necessity, a "T square."

The term instruments, in the general sense of the word, is applied to anything by which an effort is brought about, and consequently our printing-boards, vignette-blocks, &c., &c., are instruments in the case of the photographic printer, as well as the case of surgical tools are instruments in the hands of the surgeon. A skilful workman when once asked, by the foreman of an establishment, what was the instrument he had used to enable him to do his work so nicely, replied : "My hands are the best instruments I have outside of my brain."

So it is with the photographic printer, for his hands are subordinate to that mightier and more valuable instrument, *the brain* ; and consequently "a thinking man" is far more successful than a merely mechanical one (although the latter may have all the conveniences possible), for "the brain conceives what the hands execute ;" and if a person does not use his brain to good advantage, *verily his work will show it.*

Now, the whole attention of the brain can be used very advan-

tageously *in the printing-room* of a gallery, as well as in the "sky-light and the dark-room." There is a great mistake often made in the "fitting out" of a photograph gallery, in placing about all of the money in "the reception-room," and leaving a few dollars to go into the printing department, and a few more, perhaps, in the dark and operating rooms. A *good* housewife does not commence at the parlor and furnish down to the kitchen, but she commences first at the culinary department, and *after* she has furnished that (her work-room), she then commences to furnish her sitting-room, and *finally* her parlor. This is the way it should be with the photographer: he should look first to the skylight and then to the nicely fitting out of this, the operating-room, which of course includes the cameras, lenses, backgrounds, &c., &c. He then sees to his dark-room, and next, but by no means least, he sees to the printing-room, and then, finally and lastly, to his reception-room, which he furnishes as his means will permit.

An elegantly furnished reception-room does not vouch for good work, although it may indicate that the proprietor had money, or *that he had found somebody who would trust.*

A customer, when she wishes her "*likeness taken*," does not look to see if the reception-room is nicely furnished, and thus decide as to whether she will be suited or not; not at all, she wishes to see samples of work, and then decides. And since this is so, should we not endeavor to have conveniences, &c., in doing our work, so that the samples and work in general will be excellent, since it is this, and not the elegance of the reception-room, that brings in the customers?

Another illustration that the elegance of the apartments, &c., is not the criterion by which the customer judges the work of the photographer is very well illustrated in that of a well-known Parisian gallery, where the patrons of the establishment are obliged to leave their carriages at the entrance of, and walk through a narrow lane, up three flights of stairs, and directly into the operating-room, as the gallery has no reception-room whatever worthy of mention. The ladies usually make their engagements through a gentleman friend, and then proceed, *all attired*, in their carriages to the studio, and are then immediately posed. It may be well to mention here that the patrons are obliged to keep their engagements to within five minutes, or so, or they lose their appointment for that day.

The general opinion among photographers is, that any place will do for a printing-room, and it is on this principle that printers are so well known to have very inconvenient rooms, &c., where they almost invariably are obliged to labor under extreme difficulties.

Printing-rooms should be so arranged that the poor printer will not freeze in the winter nor roast in the summer; and, outside of the printer's own personal comfort, the temperature of the rooms is a matter worthy of the strictest attention on the part of the photographer, or else he cannot expect good work, and if he does expect it, without proper attention being given to the conditions under which the negatives are printed, *then he is sure to be disappointed.*

The negatives should no more be *printed* out of doors in the winter-time (more especially if the day is very cold) than they ought to be *taken* there, posing and all being accomplished, while there is light sufficient to enable the photographer to "take a picture." As before said, the fitting out of the printing-room is a matter of the utmost importance, and although it has not been recognized by the many photographers, yet it has by the few.

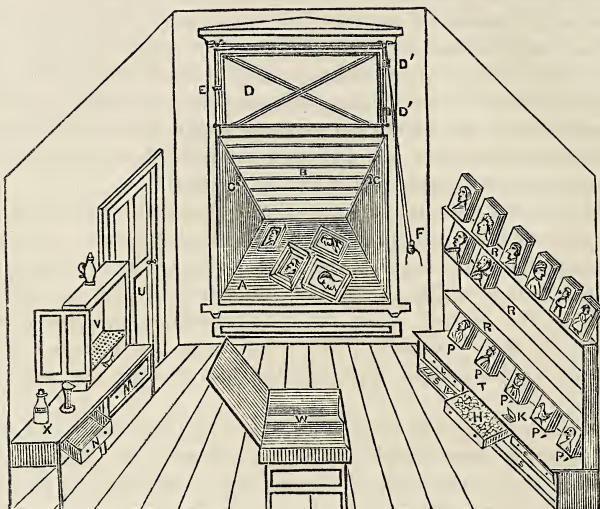
I will, in the first three figures of this book, illustrate what may be termed model printing, silvering, and toning rooms. The original rooms may be recognized by those persons who are acquainted with the gallery of Mr. J. H. Lamson, Portland, Me., as they are almost similar to his; indeed, they were originally intended to be exactly like them, but were afterwards changed a little, as I wished to give a model suite of rooms rather than to copy any particular ones.

The size of the main room, Fig. 1, is 10 x 15 x 10 feet. A is the printing-shelf, upon which the negative-boards are placed out to print. B is the sash of glass, through which the light enters on the shelf, and which sash is kept in place by the hooks C. D is a window which swings back and forth by means of the hinges D'. This window, when closed, is fastened by the button E. This window was arranged to permit the printer to open it in the winter-time and sweep the snow from the glass, without the trouble of removing his frames and then taking the sash of ground-glass in. There is another sash of plain glass made which is placed out, in place of the ground one, when it is so desired by the printer. F is the window-cord by which the curtain is pulled up or let down, as occasion requires. G is the drawer in which the albumen paper is placed when it is ready for printing. H is the drawer in which the prints are placed when printed, through the little aperture K, which is cut in the bench and supplied with a cover of tin or zinc, so as to avoid opening the drawer so often as to discolor the whites of the prints therein contained. L is the drawer in which the albumen-paper is kept. M is a drawer in which the plain salted paper may be placed; and N is another drawer in which the *unsalted* paper can be placed. P P are negatives which are to be printed, and which, when they

are printed, are temporarily placed as at P', until they are filed away, which is done in another room.

The shelves R R R are also negative shelves, which are used for special purposes, such as "the family negatives," &c., &c. The

FIG. 1.



wide shelf is made for the storing away of negative-boards, vignette-blocks, porcelain printing-frames, &c., all of which are kept *in order*. The filling of the boards, &c., will be spoken of further on; suffice it, for the present, to say that this filling is done on the bench T. U is the door leading to the "silvering and toning rooms." V is the fuming-box, which will also be explained further on. W is the box in which the old or used hypo bath is poured, and zinc is thrown into it. X is a bench which is used for one thing and another, also for keeping bottles, &c., upon.

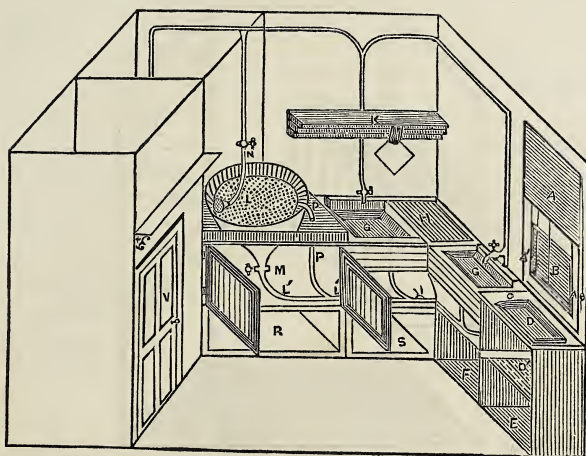
THE SILVERING AND TONING ROOM.

The principal use of this room is to sensitize the paper after it is albumenized, or in the case of the plain paper, after it is salted, and then later in the day, when the sensitizing is through with,

to tone and fix, as well as to wash the prints in, all of which things can be done without at all interfering with each other.

A is a dark curtain, which in the figure is partly raised, but during the silvering and toning processes it is brought down to A', and the *white* bleached cloth screen B (which is shaded in the figure so

FIG. 2.

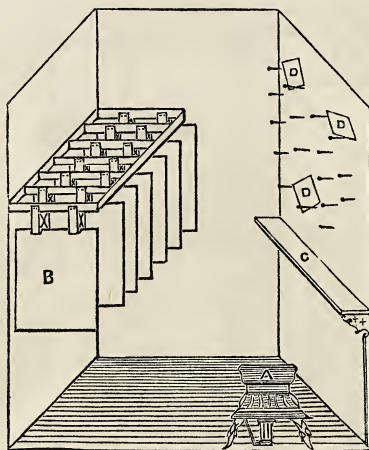


as to show it more distinctly) covers the rest of the glass, and thus, in the toning, a soft and diffused light is given to that part of the room (the shelf C) where the toning is done. D is the silvering-dish, and D' is the place where this silvering-dish is kept when not in use. E is where the kettle of potash is kept for the purpose of cleaning old plates. F is where the nitric acid tray is kept. G G are two sinks. H is a shelf on which the toning-bath bottles may be kept. K is a rack with three overlapping pieces of wood, to which there are a number of spring clips attached which hold the pictures while draining, as they are removed from the water. L is a washing-tank which has a perforated false bottom through which the water passes into the lower part, and thence into the waste pipe L'. The stopcock M is adjusted after the tank becomes three-quarters filled, so that it will permit the water to flow out as fast as it enters through the pipe N. P P is an overflow pipe, which conducts the water, when it reaches that place, into the waste pipe L'. R is the place where the hypo dish is kept. S is the place where the two-gallon hypo bottle is placed. This bottle is always kept full of a

saturated solution of hyposulphite of soda. V is the door that leads into the drying-room.

THE DRYING-ROOM.

FIG. 3.



This room was intended originally to only dry the paper, but it has finally been used for a variety of purposes, mostly all connected with porcelain printing.



Graduate.



Filtering Funnel.



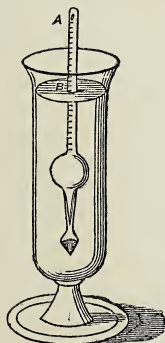
Wide-mouth Bottle.

A is the gas stove by which the room is heated. B is the paper as fastened to the clips for drying. C is a shelf on which the silver-

bath bottles, as well as the collodio-chloride bottles, are placed. D D are porcelain plates each hung upon two nails.

THE NECESSARY DISHES, SCALES, GRADUATES,
CHEMICALS, ETC.

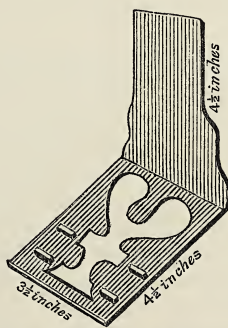
	No. wanted.
Whole Size Porcelain Dish, ...	1
Half Size " "	1
Scales, Apothecaries', ...	1 pair.
Filtering-Paper, ...	{ 2 packs— one large, one small.
Test-Tube, ...	2
Hydrometer, ...	1
Filtering-Funnels, ...	4 or 5 of various sizes.
Glass Mortar and Pestle, ...	1
Large Iron Kettle, ...	1
Graduates, ...	{ 1 sixteen ounce, 1 eight ounce, 1 one-eighth ounce.
Tack Hammer, ...	1
Wide-Mouth Bottles, ...	12 of various sizes.
Ground-Glass, ...	{ A number of various sizes.
Silver Knife, ...	1
Iron Uprights, ...	12



Hydrometer.



Test Tube.



Iron Upright for the Printing-frames to rest upon.

Besides the above there are a number of other dishes, &c., which are needed, and which will be mentioned further on in various parts of this work.

CHEMICALS.

Acid, Acetic.	Benzole.	Oil, Bergamot.
" Citric.	Calcium Chloride.	" Lavender.
" Hydrochloric.	Camphor.	" Rosemary.
" Muriatic.	Cotton, Filtering and Negative.	Potash, Caustic.
" Nitric.	Ether, Sulphuric.	" Nitrate.
" Oxalic.	Glass, Porcelain.	" Cyanide.
" Sulphuric.	Glue, Bonnet.	Silver, Nitrate.
" Tartaric.	Glycerin.	Sodium, Chloride.
Alcohol, 95° and Common.	Gold, Chloride.	Soda, Bicarbonate.
Alum.	Gum Arabic.	Soda, Sal.
Ammonia, Aqua.	Lime, Carbonate.	Turpentine, Spirits.
Ammonium Chloride.	" Chloride.	Wax, White, or Virgin.
" Nitrate.	Lye.	Whiting.
Beeswax.	Magnesium Nitrate.	

The above are about all the chemicals that are used in the printing department of photography. The object of the writer in naming all the necessary dishes, scales, graduates, and chemicals, is to aid the beginner at photography in selecting those things which are indispensable in photographic printing, as he will at times need them all, and if he gets them in the first place it will save much trouble afterwards in obtaining them.

Part I.

ALBUMEN PAPER PRINTING.

CHAPTER I.

THE POSITIVE BATH FOR ALBUMEN PAPER.

To prepare the paper so that it will become sensitive to the light it is necessary to float it upon a *positive* nitrate of silver bath ; so called on account of its being the means by which the paper is enabled to receive the positive impression from the negative. This bath is chiefly composed of crystal nitrate of silver and pure water. The strength should vary, according to the temperature of the weather and the brand of paper used.

Mr. John R. Clemons recommends for his brand of albumen-paper a bath of thirty grains of nitrate of silver to the ounce of water, for summer, and forty-eight grains strong for winter ; besides varying the time of floating the paper, according to the time of the year.

In the year 1871 there was considerable discussion in the leading photographic publications as to whether a strong or a weak bath was best for printing. Many of the leading photographers were in favor of a strong, and about as many more in favor of a weak bath.

It might be supposed that a weak silver bath would necessitate a longer time for floating than a strong bath would, and also that a bath weak in the number of grains of silver to the ounce of water would be more economical.

Now, this is a mistake. When a sheet of salted albumen-paper is floated upon a bath of nitrate of silver, the salt in the albumen will take up the silver which it needs, whether the bath is a strong or a weak one, and chloride of silver will be formed. The albumen will also take up some in the form of albuminate of silver (Vogel's "Handbook"); and then, if the sheet is allowed to remain on the bath too long a time, there will be more of the solution absorbed

than what is really necessary, which will penetrate through the surface and far into the albumen. The paper thus floated and printed will have a sunk-in appearance, owing to the silver discoloring, which is absorbed far into the albumen, as before said, during the lengthened time of sensitizing.

This sunk-in appearance is not the only fault with *long floating on a weak bath*; but the albumen will be dissolved off, being left in the bath, and the paper will not print *brilliant*, but dull; and often flat prints will be the result.

A strong bath necessitates a *long time* of floating, because the albumen on the paper is at first coagulated by the strong silver solution, and it takes quite a number of seconds for the albumen to commence to take up what silver it needs; whereas the albumen on the paper, not being coagulated by the silver in a weak bath, it will more readily absorb that silver which is necessary for the production of a good print.

From this we find :

- 1st. That a strong silver bath requires a long time of floating.
- 2d. That a weak silver bath requires a short time of floating.
- 3d. That a medium silver bath requires a medium time of floating.

There are, however, bad results obtainable by floating the paper a long time on a strong bath, as well as floating a short time on a weak bath.

When we float it a long time on a strong bath, it will, when printed, make a bold and brilliant print, *but the shadows will be very much bronzed*, even when the prints are mounted. When we float the paper a short time on a weak bath it will not be at all bronzed, but the prints are likely to be weak; and, on the other hand, if we float the paper a long time on this kind of a bath, the silver will be, as has been said, sunk-in, or, as it is sometimes expressed, the paper will be "woolly."

I do not mean by the first two remarks made above that the extremes are to be indulged in, for then, in a measure, arises the bad results named, and in the case of the weak bath the abuse of the remark will be more especially a source of failure.

We cannot, to obtain good results, use a bath weaker than 35 grains, or stronger than 60 grains of silver to the ounce of water, with many of the brands of paper which are generally used, while with other brands, 30 grains in summer and 60 to 70 in winter are best.

For the excellent brand of paper known as the "Berlin" I found, with the class of negatives I printed when using that paper, that a medium-strong bath, say of 40 grains in summer and 55 to 60 grains

in winter, of nitrate of silver to the ounce of water, was best ; while with the "Hovey" brand of paper a bath of not more than 33, or less than 28 grains of silver to the ounce of water, with 25 seconds floating, was necessary during the summer-time ; and in the winter, when the negatives are printed on the roof, I have known of a bath of 70 grains of *silver alone*, and from 2 to 3 minutes' floating, to be required to obtain good prints from the *very thin* negatives that were made.

A weak bath loses so much, after silvering a dozen sheets or so, that it commences to make itself felt, and consequently needs strengthening about all of the time.

A strong bath loses also, but the silver is not taken up in so large a proportion as it is in the weak bath, and the strong bath can be used for a much longer time, even until there will not be enough solution to sensitize the paper, without giving the printer any trouble whatever.

The prints will be better in many respects with an average bath than with either the extremes, as a trial will show to the observant printer.

All of the solution that is on the paper should be, as much as possible, on the *surface* of the albumen, to prevent "woolliness," and so as to have bold, vigorous prints ; which can be *easily freed* from the nitrate of silver in the washing.

In the making of the bath, both good nitrate of silver and water are required. In all cases where pure water is required, filtered rain or clean ice-water will answer.

To make a bath of 60 ounces of solution, and 40 grains strong of nitrate of silver to the ounce, the number of grains of silver required would be 2400 grains, or 5 ounces.

Take a large, wide-mouth bottle and add 60 ounces of pure water thereto. Now carefully weigh out 5 ounces of good nitrate of silver and add it to the water in the bottle. Dissolve thoroughly, by repeated shakings of the contents of the bottle, which is very easily done without spilling the liquid, by holding the top of the bottle firmly with the left hand and revolving the bottom in a circular motion, in a steady and even manner, with the right.

This bath is called "plain nitrate of silver bath," because of its being composed simply of nitrate of silver and water.

This bath is used by a great many excellent photographers throughout the country, except that the strength of it differs, sometimes being greater and then again often less than the strength given above.

Mr. H. T. Anthony, of New York, was the first to advise the use

of alum in the printing-bath, and since the discovery of it for that purpose it has become quite universally used. It is, indeed, the best thing that can be added to the bath to give *brilliancy* and *richness of tone* to the prints. The theory of the alum, as being an improvement when used in the printing-bath, is as follows :

The alum hardens the surface of the albumen-paper when it is floated upon a silver bath containing it, so that the solution is kept more on the surface, and when the paper is quickly dried the resulting prints appear very brilliant, printing finely, especially in the shadows, and are more easily and better toned and fixed, and the final washing is more likely to be thoroughly done.

A small lump of alum is placed in the funnel through which the bath is filtered, and the solution, as it filters, will take up the quantity it needs.

Mr. John R. Clemons has recommended the use of glycerin in the printing-bath, in the proportion of $1\frac{1}{2}$ ounces of pure glycerin to every 16 ounces of solution. It has been used most successfully by many photographers, and it is especially a good thing for his brand of paper, when it is floated for the space of one minute on a bath of 30 grains (during the summer-time) of nitrate of silver to the ounce of water.

Sal soda is often added to the silver bath in the proportion of an ounce of a saturated solution of the soda to a bath of sixty ounces. On adding this the bath will immediately turn milky, and after the solution has been thoroughly stirred it should be allowed to settle for awhile and then filtered into another bottle before use, leaving the carbonate of silver (the deposit) in the first bottle. When through silvering the paper, pour the solution back into the bottle where the deposit is and again shake the contents. In the morning the solution will be *thoroughly clear*, although the bath may have been very much discolored when it was poured into the bottle the night before.

Always let a sediment be in the bottle, and every other day add a few drops of the soda solution to the bath. Keep on "adding solution" made up as above. A few ounces of the solution should be added to the printing-bath every night after use, so as to keep the quantity up to a certain number of ounces.

I have used a bath prepared as above for eight months, and although the bath, when poured from the silvering-dish at night, was often as black as a coal, it never failed to be clear in the morning, if there was a sediment on the bottom of the bottle.

Citric acid is also sometimes added to the printing-bath, in a

greater or less degree, according to the time the paper is required to be kept, for this is principally the reason why the acid is added.

When the paper is only required to be kept a day or so after sensitizing, so as to prevent it from turning yellow by being kept over night, on account of a sudden storm, &c., the solution is made a *very little acid*, viz., a few drops of a solution of citric acid, 20 grains, water 1 ounce. If the paper is desired to be kept white for a longer time than a couple of days, then more of the acid should be added (see Chapter V, Part I). Fume fifteen minutes. The paper will print a little red, but it will most probably be very rich, although this will be according to the quality of the negatives, &c.

The "citric acid printing-bath" should be tested every morning before using it, to ascertain the *degree* of acidity. Never let your bath be acid with *nitric acid* unless it is *very, very slightly so*, as the prints besides being of a poor (photographically considered) red color are very liable to be *weak* and *flat*.

Nitrate of ammonia is very often added to the printing-bath in the proportion of as many grains of the nitrate to the ounce of water as there may have been grains of nitrate of silver added. After adding the nitrate of ammonia to the printing-bath make *slightly alkaline* with liq. ammonia.

Sunning the bath for about half an hour or so after the nitrate of ammonia has been added and the solution made alkaline is a good plan. Filter before use. I will here give a few formulæ for baths for printing which I have used and know to be excellent.

No. 1. —Crystal Nitrate of Silver,		40 grains.
Nitrate of Ammonia,		35 "
Filtered Rain-water,		1 ounce.
Saturated Solution Bicarbonate of Soda, about		8 to 10 drops,

or enough to make the bath *slightly alkaline*. In place of the sodium, liq. ammonia can be used equally as well.

Make up a sufficient quantity, and before filtering through *cotton* place a lump of alum in the funnel about quarter the size of an ordinary butternut.

The above bath is for summer use ; in the winter, both the nitrates should be increased.

No. 2. —Nitrate of Silver,		2½ ounces.
Nitrate of Soda,		2 "
Glycerin,		3 "
Pure Water,		40 "

Make it a little alkaline with aqua ammonia. This bath is very

good, indeed, for the Clemons brand of paper, and can be used also with the Hovey brand, but a bath made as below is better for this particular paper, viz., the Hovey :

No. 3. —Nitrate of Silver, ...	30 grains.
Nitrate of Ammonia, ...	30 “
Pure Water, ...	1 ounce.

Make it a *little* alkaline with aqua ammonia, and when about to filter the solution place a small lump of common alum in the funnel, or if you prefer add a grain of the alum to every ounce of the solution. The latter is probably the best. The alum, if added in this way, should be added before the bath is filtered.

Float the paper, being sure that it is a *little damp* beforehand, from twenty to thirty seconds ; draw over a rod, and blot off the superfluous quantity of silver that is still on the paper, between large sheets of white bibulous paper. Dry quickly and thoroughly, and fume ten minutes.

The above formulæ and modes of working are for summer use, but for winter the temperature of the solution should not be below 50°, and the strength of the nitrates should be increased as well as the time of floating. Print, in the winter, in the printing-room under glass, and keep the temperature of the room not below 50° or above 60°.

There are some photographers who prefer an *acid* positive bath to an alkaline or a neutral one, because the resulting prints are red, and the red tone is more easily obtained (?), *so they say*.

If the bath is acid with *nitric* acid the result will not be so fine as it would be if it was acid with citric acid, because, if the bath was any more than *very slightly* acid with the nitric, the paper floated upon it when printed will have, as above said, a disagreeable red tone to it, often being *weak* and *flat*. The best results are obtainable with a bath which is either a trifle alkaline or just neutral. A good way to regulate the alkalinity of the printing-bath is to observe how the paper prints, and then act accordingly.

If it prints too blue, a drop or so of nitric acid should be added to the bath ; if it prints too red then add a few drops of liquor ammonia. In testing this way, however, the printer should be sure that the paper is *properly fumed*, and that the results are not occasioned by poor judgment in fuming. Place a piece of blue litmus-paper into the solution before you commence to “doctor” the bath, and note the *exact* color it turns.

Nitric acid should always be added to the positive bath when it is not

desired to make the solution acid for the purpose of printing, but only to lessen the alkalinity of the bath.

RECTIFYING THE POSITIVE BATH.

The bath, after it has been used for some time, discolours, owing to the albumen of the paper being left in it after floating, or dirt and other impurities having got into it through accident; leaving the dish uncovered when the bath was not in use, imperfect filtrations, and chemical matter which was impure, and by age having showed itself.

Permanganate of Potash.

When the bath is only a little discolored, and is a new one, this solution will for awhile answer capitally :

Permanganate of Potash, ...	60 grains.
Pure Water, ...	6 ounces.

Add about half a dozen drops, and stir the solution well with a clean glass rod. At first the bath will turn a dark rose color, and it will then considerably lighten, and if it does not stay so, but utterly disappears, then add a few drops more until a temporary color appears. Now place the bath out in strong sunlight for half an hour, and after it has thoroughly cleared, and the rose color has disappeared, the organic matter can, in a great measure be filtered out.

Mr. Elbert Anderson in his book, *The Skylight and the Dark-Room*, accounts for the action of this permanganate as follows :

“As soon as the permanganate comes in contact with the bath the organic matter becomes oxidized, and permanganic acid is liberated, forming permanganate of silver, which remains in the bath, and is precipitated to the bottom in dark, brownish-black flakes, whilst the permanganate itself is converted into peroxide of manganese. As soon as the solution is perfectly clear most of the organic matter will be filtered out. Thus the permanganate precipitates most of the organic matter without the least injury to the bath.”

Kaolin.

This is often used for clearing up the printing-bath. A little of this powder is placed in the bottle containing the discolored bath, and the solution thoroughly stirred with a glass rod, and then allowed to settle for the space of a few minutes. Filter the *decanted* solution through cotton, and at night pour the bath again into the bottle containing the kaolin. Thus the same kaolin can be used for a great number of times.

Mr. F. A. Bridge, in *The Year-Book* for 1873, recommends for

those printers who use the kaolin a simple apparatus described as follows :

“Take a large wide-mouthed bottle (depending upon the quantity of solution you have in use), fit a cork to it, and bore three holes in it, one large enough to admit the point of a funnel, going well through the other side, and the other two large enough for a piece of ordinary glass tube. Bend a piece of tube in the form of a siphon, let one end reach to within about an inch of the bottom of the bottle, and let the other end be a few inches longer ; break it off below the turn in the *longest* side, and join it together again by means of a piece of india-rubber tubing about two inches long ; put another piece of glass tube (slightly bent for convenience sake) just through the cork, and the thing is made. Put some kaolin in the bottle, and after using the solution return it to the bottle through the funnel over night, and shake it ; it will be quite clear by the morning. When again required for use you have only to cover the top of the funnel, put the long end of the siphon in the dish, blow gently down the short tube, and the siphon immediately commences to act, and continues to do so while there is any solution to supply it ; and, if care is taken to stop it before the top of the solution reaches the level of the siphon-tube (which may be done at any time by pressing the piece of india-rubber tube), no scum will ever get into the dish.”

Gum Camphor Solution.

When the bath is very much discolored this rectifier is most generally used. It is made as follows :

Gum Camphor, ...	1 ounce.
Alcohol, 95 per cent., ...	6 ounces.

Add about four drachms of this solution to the discolored bath, and shake well. Probably the frothiness which is at first formed will disappear, and then it will be necessary to add another equal quantity, if not more ; shake well, and then allow the bottle to stand for a few minutes without being shaken. Filter the solution through paper, and the albumen, which united with the camphor, will be left in the filter, and the bath will be very clear.

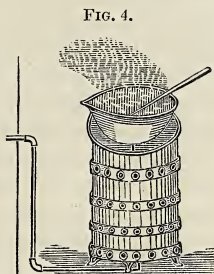
Boiling down the Solution.

About once a month or so the printing-bath should be boiled down about two-thirds. It is first made very alkaline with aqua ammonia, and is then placed in an evaporating-dish over a small gas stove, and a small jet of gas turned on. When it has boiled down two-thirds turn off the gas, and permit the solution to cool gradually, leaving the dish on the stove in the meantime.

When cool, filter through paper, and test the strength of the silver by means of Pile's test-tube and solution. Add water to reduce the bath to that strength which is best for the paper, negatives, &c. Then add the other nitrates (or whatever other chemicals that might have been used in the making of the bath in the first place) to the bath, *see to the alkalinity*, filter, and the bath will be ready for use.

Fusing the Bath.

FIG. 4. Place the bath in a suitable size evaporating-dish, and boil down to dryness at a gentle heat. Scrape the silver which has adhered to the sides of the dish down to the bottom, and stir the solution with a glass rod until all the bubbling has ceased. Now turn off the gas jet, and stir the mass constantly with a glass rod until it has cooled, and then the mass will be broken up, which is a more desirable state to have it in. In an hour or so after you have left off stirring it, you can dilute the strength of the fused mass by the addition of pure water.



Reduce to the proper strength for the printing-bath, and then filter the solution. The organic matter will be left in the filter. Now make up your bath as has before been advised, and then it is ready for use.

Sunning the Bath.

The bath is made alkaline and placed out in the sunlight, for the purpose of throwing down the organic matter in it.

The bath is very much improved by sunning, and it should always be placed out in the light when not in use.

To prevent evaporation, keep the bottle tightly closed.

Filtering the Bath.

This can be done either by means of common filtering-paper or through cotton.

Good filtering-paper can be obtained from almost any stockdealer, of various sizes, all prepared for immediate use. Sometimes the filtering-paper is rendered useless on account of there being traces of hyposulphite of soda in it, but this is very seldom the case. If you have a filtering-paper of which you are suspicious, you can test it by the following simple method :

Take a sheet of the suspected lot of paper, and place it in a small and perfectly clean evaporating-dish, in which there has been placed

a small quantity of warm distilled water, say five ounces. Cover the dish over with a glass, and let the paper soak for a few hours, and then *boil* the water, still with the paper in it, for the space of half an hour.

Take a clean test-tube, and squeeze about an ounce of the water from the wet paper into it. This should be done with *perfectly clean hands*.

Now dissolve about five grains of permanganate of potash in about an ounce of distilled water, and then add ten grains of bicarbonate of soda to it.

When this solution is thoroughly dissolved and mixed, then let fall about three drops of it into the test-tube containing the water squeezed from the filtering-paper.

If there is a trace of the hyposulphite in the water, the liquid in the test-tube will turn a more or less *greenish tint*, according to the quantity of the soda there may be in the solution. Look sharp.

If there be no hyposulphite there, the rich color of the test solution will not be lost, although its deepness may be weakened. When the latter is the case, the filtering-paper does not have anything in its composition that will be at all injurious to the bath when filtered through it.

When preparing to filter your bath solution through paper, the paper should be folded in six or eight places, so as to permit the air from the bottle to escape between the folds of the paper, and thus allowing the solution to filter quicker. In folding, be careful that you do not break the centre of the sheet of filtering-paper, at which the folds meet.

The paper should be placed in the funnel, and when the solution is poured into it to be filtered, it should be poured at the side of it, slowly at first, so that the weight of the solution will not be likely to break the filter.

FIG. 5. When it is desired to filter the bath through cotton, the cotton should be wet thoroughly with good common alcohol, and thrown into the funnel.



Now pour the solution in, and filter the bath. If it filters too quickly, *i. e.*, imperfectly, then press the cotton down further in the neck of the funnel; if too slowly, then place the glass rod in the centre of the filter, turn it round once or twice, so as to catch hold of the cotton, and then pull it up very slightly.

CHAPTER II.

SILVERING THE ALBUMEN PAPER.

UNLESS photography is practiced on a very small scale, the paper had better be floated in whole sheets, and not cut up, as is sometimes done, into half and quarter sheets.

For the purpose of silvering or floating the paper, a porcelain dish should be obtained and thoroughly cleaned before use, and when the printing solution is properly filtered, it should be poured into it.

Bubbles forming on the surface of the solution, after it is poured into the dish, should be skimmed off—if they do not break of their own accord—before the albumen paper is placed on the bath. If the bubbles do not break of their own accord, pour about an ounce of 95 per cent. alcohol into the solution, and stir well with a glass rod; or always keep a lump of camphor in the bottle, into which the solution is poured after use.

Considerable mechanical skill is required in silvering the paper properly. By proper treatment of the paper whilst silvering, many of the photographic printer's troubles are, in a great measure, lessened.

Many photographic printers, in placing the sheet of paper on the bath, take hold of two corners diagonally, and place the *centre* of the sheet on the bath first, and then in turn the two sides. In this way there will be a *row of bubbles* (minute in size) at that place where the paper first touches the bath, and which will take all the spare breath of the printer to break by blowing, *and while this blowing is being done, the paper will be silvering unevenly.*

Lay the dish on a bench in a room darkened with dark yellow curtains (see page 13), and have the length of the dish run from your right to your left hand, as you stand facing it.

In preparing to lay the sheet on the bath, first turn up the four corners of the sheet of paper to be sensitized at about one-eighth of an inch from the edge, so that you can readily lift it from the bath without having your fingers come in contact with the solution.

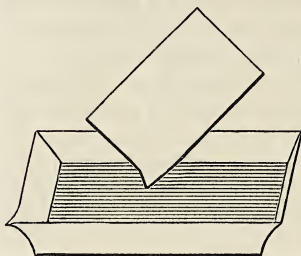
I also, especially when the paper is dry, gently draw my thumb-nail along the sides of the *back* of the paper, at about one-quarter of an inch from the edge, being careful in doing so not to crack or break the albumen. This is done so that the sides of the paper will curve evenly in the silvering, and there will not be any sharp angles to it, causing it to sink below the surface, and the solution to flow upon the back of the sheet, thus spoiling the paper.

Remark.—The sheet of albumen paper, as it lies before you in

the drawer, is supposed to be back up, and consequently albumen side down.

Take up the upper right-hand corner of the sheet (the length of it should run from your right to your left hand) with the right hand, and the lower left-hand corner with your left hand, and let the sheet assume a curved position, the right hand being highest. Lay the lower left-hand corner of the sheet (which you have hold of with the

FIG. 6.



thumb and forefinger of the left hand) on the upper part of the dish (see Fig. 6), midway between the right and left-hand corners, keeping hold of the turned-up corner while it is there, for the purpose of guiding the corner to its proper place in the dish.

As you hold the sheet at present, the upper right-hand corner is up in the air, being held there with the right hand.

Now draw the corner that is on the solution gently towards the lower left-hand corner of the dish, and at the same time slowly lower the paper on the bath with the right hand, so that by the time the lower left-hand corner of the paper reaches its proper place, the whole of the sheet will be lying in the solution.

The drawing of the paper towards you drives the bubbles that may be on the bath before the sheet, so that when the sheet is all on the bath, the bubbles, if there are any, will be along the edges of and beyond the paper. A slight tap on the back of the paper may be necessary, but that is all.

While drawing the corner towards you, and lowering the others, be careful that you do not dip the edges of the sides of the paper below the surface of the solution.

If there should be a few drops of the solution on the back of the sheet while on the bath, they should immediately be blotted off to dryness with white blotting-paper.

Frequently when the sheet is first placed on the bath, especially during the cold weather, the edges of the paper will curl over. This is a frequent occurrence at all times of the year, where the albumen paper has been for a long time albumenized. Breathing gently (*not blowing*) will immediately flatten it. The principal reason why this occurs is because the paper is too dry, as the moist air of the breath plainly proves, and hence a remedy shows itself: *keep the paper in a very moist place for a day before sensitizing it.*

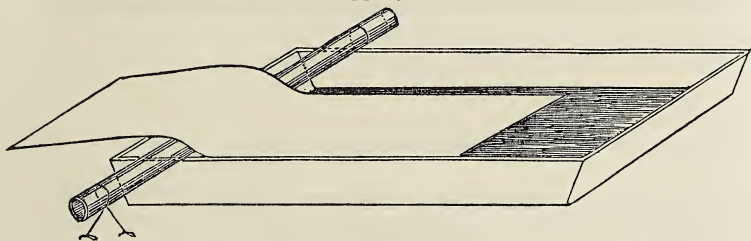
After the paper has been silvered long enough, it is then to be

raised from the bath. Take hold of the *lower left-hand* corner with the left hand, and slowly raise the paper until the *upper left-hand* corner can be caught hold of and held with the right hand. Keep slowly raising the sheet until all the corners are off, and then let the few drops drain off that corner which was *placed on the bath last*.

Hang the paper in a dark closet to dry, having that corner the *lowest* from which the solution was drained off into the bath. Use a spring nipper to suspend the paper by while drying, or hang it on poles, the sheets being placed diagonally, albumen side up, the pole running from corner to corner under the middle of the sheet. This last method prevents the solution from draining to one end of the sheet, as it will do when hung at full length, unless the surplus be removed by one of the methods hereafter described. An even coat of the solution is thus given to the paper, so that all parts of it will print alike. *The bath should be stirred every time a sheet of paper has been removed from it.*

It is an excellent plan to draw the sheet of paper, upon removing it from the bath, across a glass rod (Fig. 7), or if the edge of the dish

FIG. 7.

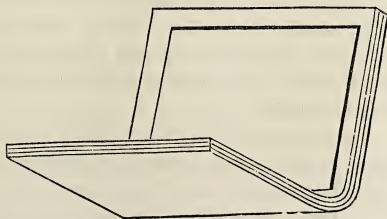


is even, then over that, so as to leave the superfluous solution in the bath. I am very much in favor of using blotting-paper for the purpose of blotting the paper as it leaves the bath (Fig. 8), and then give the final drying to the paper by artificial heat.

After the bath has been standing for some time without being in use, there will be a reddish scum on the surface of it, which should be removed with strips of white bibulous paper before another sheet is floated.

The time for floating

FIG. 8.



the paper depends upon the strength of the bath, the temperature of both the bath and weather, the brand of paper used, and the class of negatives that are to be printed.

As a general thing, the paper is floated from twenty to sixty seconds in the summer, while in the winter it is floated from forty-five seconds to one minute and three-quarters.

There are so many local things to be taken into consideration, that it is almost impossible to state exactly as to how long the paper will have to be floated, and the beginner will have to make this his constant study, to learn the exact number of seconds necessary.

The double albumenized paper should be silvered a much longer time than the single, and to prevent cracking of the film, the paper should be damp before handling it for floating, and the finished prints, after washing, should be kept wet until mounted.

When the bath is not in use, and is in the silvering dish, it should always be covered up.

Pour the bath back into the bottle every night, wash the dish out thoroughly, saving the first two washings, and until again wanted, set it away, bottom upwards, on a shelf covered with clean paper.

CHAPTER III.

DRYING THE PAPER.

[See Drying-room, Fig. 3.]

THE sheets of paper, while drying, should be placed about six or eight inches apart, so that they may not come in contact with each other, while damp, by means of slight draughts of air, thus spoiling the sheets of freshly sensitized paper, at least those parts of the sheets where they meet.

A gas stove is generally used for heating the drying-room, partly on account of the little difficulty necessary to prepare it for heating, and then again on account of its small size. It does not occupy much room. An excellent one for the purpose can be obtained at a small expense.

A soapstone, about 6 x 8 inches in size, should be placed over the stove, and the gas turned on full head for a few minutes, until the stone has become very hot, then it may be turned down to a small jet. The reason why this stone is generally used is because it gives

a. diffused heat, and the sheets of paper may be placed quite near the stove and also near each other without waving enough to make them come in contact. The paper in this way is very quickly dried.

During the summer it is not necessary to light the stove until all of the paper is silvered, and only then to dispel the slight moisture that may be on the surface.

Usually during the summer season, while you are silvering the sixth or seventh sheet of paper; the first one or two will be dry enough to fume, so that an assistant can go right to work at printing in about half an hour after you have entered the printing-room in the morning.

On damp days, it will perhaps be necessary to keep the drying-room quite warm for an hour or so in the morning, until you have silvered all of the paper necessary for the day's work.

In the winter a stove is required a longer time than in summer, but there is no necessity for having the gas burning more than an hour or so during any day for the whole year round.

It is on account of "*that terrible gas-bill*" which is always coming around every month, that many photographers allow their paper to dry up spontaneously, and thus waste considerable time; when if a little attention was given to the time the gas should burn, the expense would be comparatively trifling. When the paper dries spontaneously, the surface of it dries dead.

The paper should be dried quite quickly and thoroughly, for then the surface of it will be very brilliant and glossy, and the resulting prints will be much finer.

Clean pieces of tissue- or blotting-paper should be placed on the lower corner of the sheet, for the purpose of absorbing the silver solution which collects at that particular place, so that if the paper should happen to curl over, the corner would not come in contact with the rest of the paper in a wet state. To prevent the paper from curling up while drying, a stick having a spring nipper attached to each end of it is fastened to the lower part of the sheet.

CHAPTER IV.

FUMING THE PAPER.

THE paper, when thoroughly dry, is to be fumed. The advantages of fuming the sensitive paper are these :

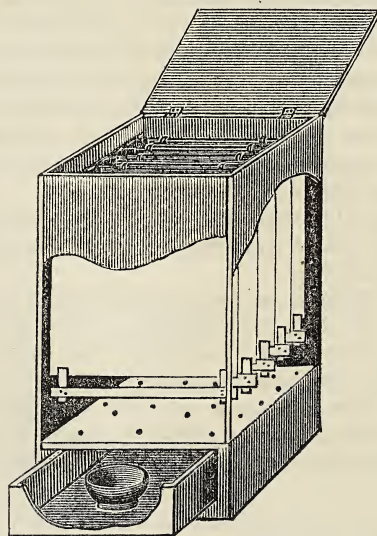
1st. The paper prints richer, quicker, and more brilliantly.

2d. The prints tone easier, and in the finished pictures are much more pleasing and satisfactory.

The printed fumed paper (when the nitrate bath is in good order, and worked properly) will print a very rich purple tone, tending slightly to blue in the hair, background, and light shadows, while in the deepest shades the color will be very brilliant and beautiful. It is well known by experienced printers that the better the paper prints, the better will be the finished pictures, and since fuming undoubtedly improves the printing-paper, it has come to be a very necessary part of the printing process.

FIG. 9. The construction of the fuming-box is very simple. Take any common wooden box large enough for the purpose, and make a door of suitable size for it, which, when shut, will totally exclude all light. Make a false bottom in this about six inches or so from

FIG. 9.



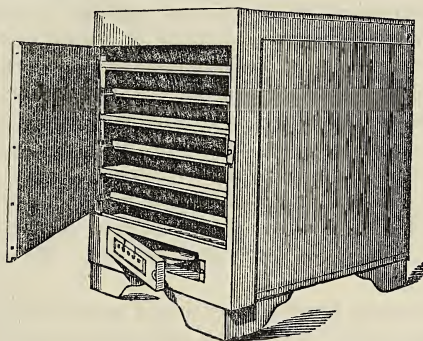
the real one, and perforate it with holes of about the size a large gimlet would make. These holes should be very numerous, and at the centre of the board there should be, if anything, a smaller number of them, because the saucer containing the liquor ammonia is generally placed at the centre of the real bottom of the box.

Mr. W. L. Shoemaker's box may suit many better. He says of it in the *Philadelphia Photographer* :

"The cut below represents a box which I offer to the fraternity. As I do not intend to patent it, I will feel sufficiently repaid if I hear of any adopting it in their establishments.

"I claim as an improvement an entirely novel method of causing

FIG. 10.



a perfect and even distribution of the ammonia fumes upon all parts of a sheet ; so that, if properly silvered, the sheet will give a perfect and even print.

"We have, in Mr. Moore's establishment, used for nine years a box which conveyed the fumes from the space in the bottom through holes into the fuming-chamber, the sheets standing upright. But the objection is, that part of the sheet nearest the bottom is stronger than top or centre, which, when printing as we do, in whole sheets, invariably show a decided difference in the two ends.

"To avoid this, and cause a perfect distribution of the fumes, I have constructed the above box. We have used this box constantly for nearly three months, and fumed hundreds of sheets in it, and can with confidence offer it as doing everything I claim.

"The amount of ammonia is no greater than formerly used ; the time of fuming is increased two to three minutes. In all the old boxes in which no draft is used, the paper becomes damp or limpid and quite decomposed on a warm, sultry day. In this box the paper remains perfectly dry, no matter how long fumed.

"There is another advantage : when the box is opened, after fuming, it does not leave fumes into the room.

"A sheet of paper is tacked, or fastened by the American clothes-clips, to the bottom of each slide ; another is laid on the top. When all are filled, pour ammonia into the dish below, close the door, open

the draft-slide, and the fuming goes on. The box we are using, and from which the above was copied, is intended for full sheets, 18 x 22.

"The dimensions of the inside (fuming-chamber) are as follows : 26 inches deep, 19 inches wide, and $17\frac{1}{2}$ inches high. The slides are $19\frac{1}{2}$ inches wide, $24\frac{1}{2}$ inches long. The space below, for fumes, is $2\frac{1}{2}$ inches high. The fumes are carried to the back end of the floor of the fuming-chamber, which has an opening $1\frac{1}{2}$ inches across its whole width, which allows the fumes to ascend into the first slide space. The first slide fits flush against the back of the box, and has a space of $1\frac{1}{2}$ inches across its front end, which allows the fumes to ascend to the second slide space. The second slide has its opening at the back end, and allows the fumes to come into the third slide space, and so on, until we reach the top of the box. The chamber for carrying off the fumes has its opening at the front end of the box. The pipe for conveying off the fumes is placed at the back end of this chamber, on the top of the box. We use a 2-inch tin pipe.

"It is necessary that the pipe should be attached to a chimney-flue, or attached, as we have it, by what iron-workers call a 'jacket,' on the stove-pipe. This is the best way, as you are always certain to have a good draft, which can be regulated at the sliding front of the door of the fuming-space."

It may perhaps be better, since it does not retard the time of fuming so much, to have a fine wire gauze placed about the same number of inches from the bottom of the box as was recommended above for the false bottom, and then the fumes of the ammonia will ascend more rapidly ; and to prevent the ascension of it so very rapidly at the centre, and thus cause uneven fuming—especially at the lower part of the sheet—a piece of pasteboard can be placed on the gauze directly over and covering the greater part of the dish.

This box should be made large enough for fuming three or four sheets of paper at a time, which is all that is necessary to fume at one time in most galleries, especially during the summer, when the paper discolors so quickly after it is sensitized.

The sheets should be suspended in the air by means of a spring clip. Four laths, about three inches apart, and running parallel to each other, should be fastened to the top of the box, and a slip fastened to each end.

By placing two sheets back to back, you can fume eight sheets of paper at a time should you wish. Place about half an ounce of aqua ammonia in the saucer on the bottom of the box, shut the door, and then time the paper.

Some persons use carbonate of ammonia for fuming on account of

its cheapness, but I do not see any gain in it, for what is gained by its cheapness is more than lost by its very insufficient fuming.

Carbonate of ammonia is very often used together with the aqua by pouring a few drops of the liquid on the lump of carbonate. This is said to be an economical way of fuming the paper, for with the use of the carbonate it is only necessary for a few drops of the stronger ammonia to be used, for there will then enough vapor arise to accomplish our object effectually.

Fuming with ammonia imparts a slight dampness to the paper, which during the hot months of summer may be considered an advantage; but during the damp days, when the paper is always damp, it is otherwise, and consequently the use of some substance in the fuming-box is required, which will take to itself the moisture, and leave the fumes of the ammonia alone to act upon the paper.

Chloride of lime is a good thing, and answers admirably. This is a moist, grayish-white substance, having, in a slight degree, the odor of chlorine.

It has powerful bleaching properties, and prevents the paper from turning yellow while fuming, a very common occurrence during the hot months with some brands of papers. It also improves the printing qualities of the paper, gives a virgin whiteness to the vignettes, and prevents the discoloration of them after printing, when the discoloring occurs only from the heat of the printing-room. It is best, when you wish to use this lime in connection with aqua ammonia, to pour a few drops of the liquid in the saucer, and uncorking the bottle of the chloride of lime to sprinkle a little of it on the ammonia, and *immediately* close the door. A dry white vapor of the lime and ammonia will ascend, which will give to the paper the properties named above.

The paper while drying will curl up, thus causing it to fume unevenly. To prevent this the lower part of the paper should be held by a lath which has a spring clip nailed at each end of it.

The time of fuming the paper depends upon the state of the nitrate bath, the quality of the negatives, the temperature of the weather, and the brightness of the light.

Paper silvered on an acid bath needs much longer fuming than when silvered on an alkaline or a neutral one; paper for intense negatives less fuming than weak ones; during the summer less fuming than during the winter; and on a dark day less fuming is required than on a bright day. All these things are to be taken into account, and the beginner will do well to note them carefully.

As to the first of these, the printing-bath, if the bath is acid the time of fuming should vary with the amount of acidity, and

that time can be ascertained by fuming until it prints a rich color without showing any signs of weakness. If the bath is alkaline or neutral less fuming is required than if the bath is acid.

As to the second of these, the quality of the negatives, a hard, intense negative should be printed upon paper fumed a very little, as too much fuming increases the sensitiveness of the paper, and makes the negatives yield harsher prints than what would be the result if the paper were fumed a less time. A thin or weak negative yields the best prints upon paper that has been fumed a long time, as it increases the sensitiveness of it, and makes greater contrasts, which is just what we wish. As for the medium negatives, fume a medium length of time.

The temperature of the weather is also a very important item in considering the fuming of the paper. During the hot months of summer the paper can bear less fuming than during the winter months, when the strength of the bath and also the time of the fuming must be increased.

The brightness of the sunlight must also be thought of, for when the light is bright and the weather good more fuming is required (so as to prevent mealiness) than would be necessary if the opposite were the case.

CHAPTER V.

PRESERVATION OF SENSITIVE ALBUMENIZED PAPER; WASHED SENSITIVE PAPER.

THE preservation of the sensitive paper has attracted considerable attention among photographers generally, on account of the many advantages to be derived from being able to preserve paper in good working condition for a certain length of time after it has been prepared.

For amateurs, and for those professional photographers who only have occasion to print now and then, often not more than half a dozen times a month, a durable sensitive albumen paper would be an excellent thing, and for that reason the subject is worthy of the strictest attention.

Amateurs have been the most successful in experimenting in this direction, owing, most probably, to their greater interest in securing the desired result, besides their having much more time to do so

than the photographer with a good business would have. I will give some of the formulæ used, and make some suggestions that may help those who wish to prepare paper in this way.

For the purpose of preparing the bath so that it will keep the paper when floated upon it in good condition, such acids as oxalic, citric, and tartaric are added in various proportions to a plain silver bath, ranging from 25 to 45 grains of nitrate of silver to the ounce of solution.

The paper is then dried, and kept between large white sheets of blotting-paper, or in dark drawers in which there is a box placed containing chloride of calcium, which is there for the purpose of absorbing the moisture from the air, so as to keep the paper thoroughly free from it, which is very essential if the photographer desires to keep it for any length of time.

An excellent method, and which is used very successfully in England, is to make up a bath of about forty grains of nitrate of silver to the ounce of solution, neutralizing it with sal soda. The paper is floated from 45 to 75 seconds.

Make up a carbonate of soda solution, from 20 to 25 grains of the soda to the ounce of pure rain-water, and float large sheets of blotting-paper upon it until they have become thoroughly saturated with it, and then remove and dry them thoroughly. The sensitive albumen paper, when it is about three-quarters dry or while there is a moisture to the surface, is placed between sheets of the dry carbonate of soda blotting-paper and evenly pressed. The paper is then removed to fresh blotting-papers, until the moisture has all been absorbed.

The paper will then have carbonate of silver in its composition, which renders it very sensitive to the light, prints finely, and it will tone much more beautifully on account of its alkalinity than an acid paper will. The paper will keep in good condition in the summer for one month, if it is kept in a cool and totally dark place, and in the winter it will keep two or three times as long.

A process which is very highly recommended by Mr. J. R. Johnson, in a recent number of the *British Journal Almanac*, I will here give, having proved its value by a trial of it as he recommended, and the only fault I found with it was, the silver being too weak for the purpose of obtaining as sensitive a paper as I would wish. He recommends a bath of 25 grains of nitrate of silver to the ounce of water, but I have found a bath of 35 grains strong to be better. The bath as changed is as follows :

Nitrate of Silver,		35 grains.
Citric Acid,		25 "
Water,		1 ounce.

Make up a bath of 60 ounces as above. The writer of the article recommends pouring a certain quantity of solution on the paper and then brushing it over the surface, but as floating is probably more convenient, and knowing the result is as good, I should recommend the reader to float the paper 60 seconds and then dry thoroughly.

Pack away without fuming, between dry sheets of blotting-paper, and keep in a dark and cool place. Before printing, the paper should be fumed with strong ammonia full twenty minutes.

Mr. Johnson says that the paper will keep well from eight to ten months. I have, since preparing it, kept it up to the present time, full two months, in excellent condition, and, judging from the prints I have made on it, I see no reason why it should not keep for the full time he says, in excellent working order.

WASHED SENSITIVE PAPER.

Paper sensitized in the usual way and then washed acquires keeping properties similar to that floated on a bath prepared especially for the purpose. The paper when washed should never be *soaked* in a bath of water, but only drawn through it *once*, and should not be permitted to remain in it more than one second longer than is really necessary, or it will surely make flat prints. The paper is floated upon the silver bath as you would do for ordinary sensitizing, and when drained sufficiently it is drawn through a lukewarm bath of pure water, permitted to drain again, and then hung up to dry.

Long sensitizing on a strong bath is necessary for the success of the washed paper, and the water should be fresh every time you wash a sheet of paper. The used water can have the silver in it thrown down in the form of a chloride by sprinkling a little salt in it.

An excellent bath for the paper that is destined to be washed is made as follows :

Nitrate of Silver, ...	60 grains.
Nitrate of Ammonia, ...	30 "
White Sugar, ...	3 "
Pure Water, ...	1 ounce.

Make *neutral* (*i. e.*, neither acid nor alkaline) with bicarbonate of soda: float two minutes, let drain, and then pass the paper quickly through a citric acid bath of one grain of the acid to the ounce of pure water. Dry thoroughly and pack away the paper in the dark without fuming, being careful not to expose it to the light.

This paper will keep white for months if it is packed between

blotting-paper in a box which is made air-tight. To preserve the paper for a long time, it is necessary—first, to prevent *white* light from ever striking the surface until it is to be printed; second, to always pack the paper in a dark room, and the packing should be so conducted that the paper in the boxes should be perfectly protected from the air; third, the packed boxes should be placed in a cool and dry place, and not in a place where the atmosphere is apt to be changeable.

The paper should be fumed from 20 to 25 minutes, when about to print it, and chloride of lime should be in the fuming-box at the time, to absorb the moisture of the ammonia and to keep the paper white, for preserved sensitive paper turns quite yellow while being fumed.

Paper is often, instead of being drawn through water, floated upon a bath containing alum in the proportion of four or five grains of alum to the ounce of water, or on a bath of water in which there is a little hydrochloric acid. There is some fault found with the acid on account of its being too insensitive. Objection is also raised to the simple citric acid, but in the latter case, instead of its being too insensitive, it is the reverse.

In the case of the citric acid, if the number of grains of the acid to the ounce of water is not too large, it will work well.

Durable sensitive paper, whether washed or not, should always be fumed before use.

TONING.

For good success at toning the citric acid (durable) paper, whether the acid is in the composition of the printing-bath, or whether the paper is drawn through or floated upon a bath of diluted citric acid, the washing before toning should be comparatively very slight, and although the paper may be red, you should soak the prints in a very weak bath of acetic acid and water, a minim of the acid to the ounce of water, for five minutes, and then rinse well. For toning citric acid paper, have the bath very alkaline, and if the prints should refuse to tone nicely drop in about six to eight minims of a plain silver solution, ten grains strong, of the silver, to the ounce of the water. Stir well, and let stand for five or ten minutes.

Warm the toning solution quite warm and then allow it to cool to a lukewarm state before using. The ordinary toning bath can be used very successfully in toning the durable paper; indeed, there is no necessity for any other bath than the ones which will be given in a future chapter.

The alum-bath paper will tone more easily than the citric acid, and in toning this paper the toning bath need not be so alkaline.

CHAPTER VI.

CUTTING THE PAPER.

IN cutting up the paper for printing due regard should be given to the materials employed. In the first place, the fingers should be free from anything that will stain or soil the paper, and they should never touch the *silvered* side, but always the *back*.

The hands should be perfectly dry, free even from any perspiration, for if this is not strictly regarded in the handling of the paper "finger stains" will appear on those parts of the paper with which the fingers come in contact.

To guard against this, a rough crash towel should be suspended in a convenient place, and the hands wiped upon it as often as may be found necessary, say once in every five or ten minutes. An ivory newspaper cutter, about eight inches long and an inch wide, together with a suitable sized pair of shears, will be all of the instruments necessary.

In cutting the paper for very large prints, such as 13 x 16, 14 x 18, 16 x 20, &c., the beginner had best (to obtain the right size) lay over the sensitive paper the proper size mat that is to be placed over the print when finished and then cut accordingly. Considerable paper can be saved in this way and printed in card size.

There should always be an assortment of different size mats in the printing-room; one of each size will do, which should be kept expressly for this purpose.

In cutting the paper for an 11 x 14 print the length of the sheet is generally placed before the printer, and the paper bent over to the further edge of the sheet, and then creased, and thus cut into two equal pieces, one of which can be used for the contemplated print. I would recommend that instead of taking exactly one-half of the sheet of paper, as described above, to take about *an inch more* than the half, so as to allow for any slight tear that may happen along the edges of the paper during the washing, toning, &c., and also so as to be sure of having the paper plenty wide enough for the different sized mats.

I have seen some nice prints printed upon the exact half of a sheet of paper, which, when taken from the final washing (and the edges trimmed, being slightly torn), were then too narrow to be covered with the proper size mats, and had to be rejected, whereas, if in

cutting this paper they had made allowance for this final trimming, the prints would have been saved. The rest of the sheet can be cut very well into sixteen or eighteen card pieces.

In cutting cabinets out of a sheet fifteen is all that can very well be obtained, and to get that number lay the sheet on a wide table, or printing-bench (with the length of it running from right to left), and divide it into three equal parts. By laying the cabinet-glass on these strips of paper, and cutting the paper a little wider than the glass, five cabinets can be obtained from each strip, and fifteen out of the whole. These pieces will be plenty large, both in length and width; besides, this is a very convenient and economical way to cut the paper without waste.

By a glance at the cut (Fig. 11) it will be seen that the size of the pieces will be $4\frac{3}{4} \times 6$ inches, and consequently there will be more room for the width than there will be for the length. The edges of

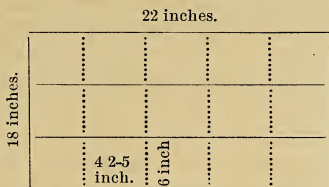


FIG. 11.

the width side of the paper can be trimmed a little, as there is usually some little tear, or some other defect, that can thus advantageously be got rid of. Often, when there are only a few cabinets to be printed, I take a quarter sheet, and bend over the length of it to about three-quarters of an inch of the opposite side, crease it, and then cut with the paper-knife. You thus obtain a large and small piece; the smaller one of these can be cut into four cards, and the larger one can be cut in two, and thus obtain two generous size cabinets, or the printer can use the larger of the two pieces for printing the 4×4 size. This is the way I obtain my 4×4 pieces when I wish them.

The beginner must remember that, in bending over the *length* of a sheet of paper 18×22 inches in size, the divided paper will be 11×18 inches in size, which is termed, in the language of the printing-room, half-sheet.

To obtain the quarter sheet the *length* of the *half-sheet* is cut equally in two pieces, and then the size will be 9×11 inches.

A glance at Fig. 12 will show that either a generous size, 4×4 , or a couple of nice cabinet pieces, together with four *cartes*, can be easily obtained from a quarter-sheet.

To obtain 32 cartes, quarter the sheet, and divide each quarter into eight equal pieces.

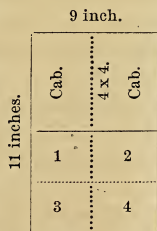


FIG. 12.

FIG. 13. To obtain 36 pieces out of a sheet it is necessary for convenience to first quarter it, and then divide it into three equal strips taken from the *length* of the paper. The pieces, as thus cut, will measure $3\frac{3}{8} \times 9$ inches, which will answer admirably for the *stereoscopic* size.

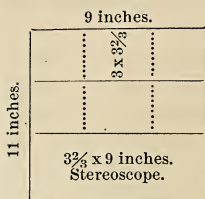


FIG. 13.

Each one of these strips of paper can be cut into three generous *cartes*, making nine out of a quarter, and thirty-six out of a whole sheet.

Forty-two *cartes* can be obtained very neatly by laying the sheet before you (Fig. 14), and dividing the length into seven equal parts; when done each strip should measure $3\frac{1}{2} \times 18$ inches. Now, out of each of these seven strips of paper there can be six pieces of paper cut, which will be $3 \times 3\frac{1}{2}$ inches in size. The whole number of pieces will be forty-two. It will be seen that the size of the *carte* pieces ($3 \times 3\frac{1}{2}$ inches) does not allow but a very little room for waste paper in trimming after printing, and thus it will be found necessary to exercise some care in placing these pieces on the negative for printing.

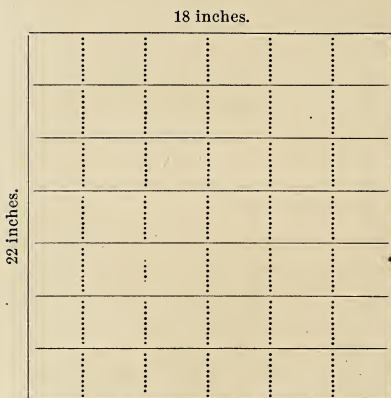


FIG. 14.

To obtain the forty-two card pieces from the sheet without waste great care is required in the sensitizing of the paper to prevent tearing, and also to prevent silver from getting on the back of it; and in the cutting of it to use either the shears or the paper-knife with care, and *do not tear the paper with the hands*, as is very often done, especially when the printer is in a hurry.

In making out the above I have considered the sheet of paper to be 18×22 inches in size, but it is seldom that the sheet measures *exactly* this, for the *length* often measures from one-quarter to one inch more, but never less, while the width is invariably the same. When this is the case a little better margin is allowed in cutting the sheet up, which is a good thing, especially when a large number of small pieces are to be obtained from the sheet. Forty-two pieces is all that should be obtained from a sheet of paper which measures

18 x 22 (or 18 x 22½, &c.) inches, because the pieces of paper are now as small as they should be with safe results to the prints, on account of bad edges, &c., which it is often necessary to trim after printing. There is a way to obtain forty-eight and even fifty-two pieces of paper from the sheet, but I would not advise any of my readers to try to obtain that quantity, as there are many disadvantages connected with it that more than neutralize the benefits. The paper is sometimes cut up to the *exact carte size*, and then printed up as it is, thus saving the trimming of the prints after printing. This is, perhaps (?), a good way, but for the beginner it is very risky, because the paper will have to be placed *exactly on the negative* or else the print will be worthless. Even to the experienced printer this is very difficult, because the greatest care and skill are required to do it *as it should be done*; then the *inexperienced* printer could not hope to do it successfully.

CHAPTER VII.

THE PRINTING-BOARDS.

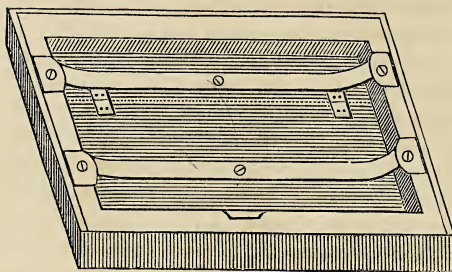
FOR the purpose of printing from the negatives upon the sensitive paper, printing-boards are constructed. The sizes of these printing-boards vary according to the size of the negatives. The imperial and the common card negatives are generally made upon 5 x 8 glass; then the printing-boards intended for this size glass should have this dimension on the bed of the frame. The whole-size negatives should be made on either the 6½ x 8½, 7 x 9, or even the 8 x 10 size glass, and for the printing of them a larger board is, of course, necessary, which should have (as in the case of the smaller boards) a bed of the same dimensions as the different size negatives. Besides the bed printing-frame there is also another kind of board used, which is called the flat printing-board.

It is absolutely necessary that the printing-boards should be made of some well-seasoned hard wood, as they are exposed in all climates and temperatures. The depth of the bed printing-frames depends on the particular use that the board is to be put to. For instance, a certain kind of boards are made for printing plain or medallion prints, and another kind for printing vignettes.

Now, in the latter case, it is essential that the boards should be made deeper than in the former, because, in printing vignettes, greater softness is thereby given to the prints *if there is considerable space between the negative and the vignetting card board*.

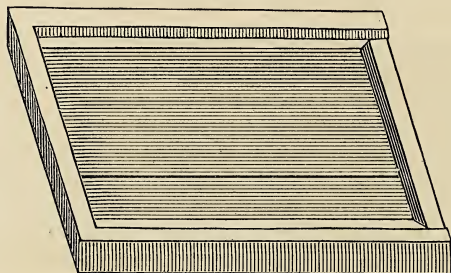
You ask, Why not make all of the boards deep, as they will be much more handy? Because the depth of the boards will cast a

FIG. 15.



shadow over the impressions on the negatives if the rays of the sun strike them obliquely, and thus ruin the prints; but this may be remedied, and the boards all made quite deep, by placing them when printing, up to the sunlight. This is not always advisable, however.

FIG. 16.

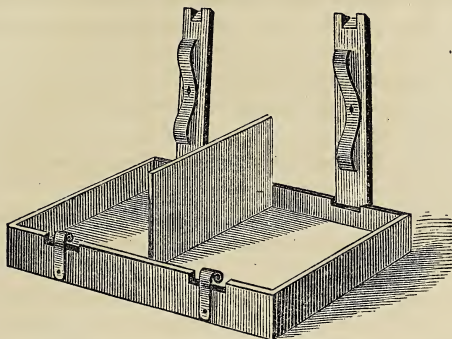


In speaking of deep (raised) printing-boards, I refer more to small ones, as 5×8 , $6\frac{1}{2} \times 8\frac{1}{2}$, &c. (Figs. 15 and 16), rather than to the largest sizes, viz., 11×14 , 14×18 , &c., for in the case of the common card and the so-called cabinet, we can obtain by far better vignettes by printing them by means of common card-board of a suitable size and shape, opening and raised printing-boards, than we can with the wooden block; while with the larger sizes, I prefer the nicely made vignette-blocks. However, more of this will be written of hereafter.

The backboards of the frames should also be made of well-seasoned wood, and the springs, which should be attached to them, should be made of good spring brass, and so arranged to them that they will give an even and gentle pressure to the negative when it is placed in the frame, and the backboard fastened in.

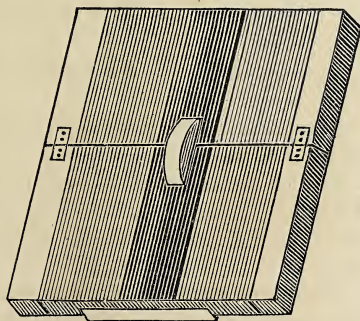
The springs meet the backboard of the smaller frames in one place, which is generally the centre of the frame ; but in the large frames they meet the *backboard* in *two* places (Fig. 17), and for convenience are not attached to the backboard, but to the frame itself, swinging back and forth at will by means of the hinges.

FIG. 17.



The backboard should have soft pieces of cotton flannel glued to it, napped side out, on that side of course which is to be placed nearest to the negative. This gives a soft cushion to the backboard, which is a desirable thing. As a general thing, loose pads are placed in the board on to the sensitive paper, but there is no absolute necessity for this, if there is one or more good pieces glued to the backboard. The printing-boards thus far described have consisted of two parts, the frame and the backboard, but there is another very good frame (Figs. 18 and 19), which is very popular among printers on account of its convenience when printing the crescent line on the medallion prints, as well as for various other uses. Its construction is very simple, consisting of a flat piece of some hard wood, the width of which is cut into two pieces in such a way as to have one piece one-third larger than the other. The separate pieces are now joined together by means of a couple of small hinges.

FIG. 18.



A button is fastened to the smaller of the two pieces. This button should be large enough to keep the two pieces together when it is buttoned. This arrangement will permit of the larger of the two pieces being lowered or not, according to the desire of the printer. The reason of this will at once be obvious.

On the front part of the board, and at the lower part of it, two or three pieces of woollen cloth should be tacked, which will give the paper, when laid upon it, a soft, yet sufficiently hard cushion for the purpose required.

The negatives are kept in place on these boards, if printing is to be done, by means of some spring brass with wooden feet, each foot, two in number, being made of a piece of wood two inches long, one-third of an inch wide, and about one-half of an inch thick.

These feet are fastened to one end of each spring by means of some screws; they are so fastened that they will move or not, at the option of the printer. The other end of these springs are fastened to the lower corners of the board.

The wooden feet are used for the purpose of keeping the pasteboard (attached to the vignette-blocks) close on to the negative, as well as to have the broad surface of the wood on to the negative rather than the brass itself, as the latter is very dangerous to the safety of the negatives.

Never use the common iron springs in vignetting, as they are very likely to slip and break the negatives.

CHAPTER VIII.

KEEPING TALLY.

THERE are various methods adopted for the purpose of keeping account of the number of prints obtained from the negatives.

One of the best ways to keep tally that I have ever seen or used I will here give. It is both simple and convenient, and there is no need of any mistake whatever if the printer is attending to his business.

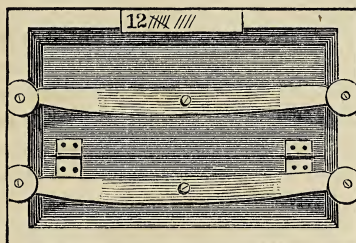
There are many disadvantages connected with the other devices of keeping tally, and the greater part of these are the liability of mistakes occurring in one way or the other, and the inconvenient manner of keeping the tally.

The materials used for this purpose are a soft lead-pencil and some strips of common erasable tablet.

A part of the main printing-board is cut away for this purpose, and that part should be the back part of the frame, so that in taking a print off the printer will be reminded to make a mark or tally for it, his attention having been attracted by seeing the tablet.

The necessity for cutting away a part of the board is because *the surface of this tablet should be below the level of the top of the board*, for then it will not be rubbed and scraped by contact with other boards, and thus, in a very short time, ruin the tablet, which it would do if precautions were not taken to the contrary.

This tablet can be glued to the board, or tacked with one-ounce tacks.



Keeping Tally.

It will be seen by a glance at the cut that *ten* prints have been printed from the negative in the printing-frame, and when two more are printed the order will be done. When this negative is finished the marks on the tablet can be erased with a damp rag, and the negative placed away. Another negative is placed in the frame, the number of prints wanted are placed at the left of the tablet, and then this negative is ready to be printed, and the tally kept as before.

CHAPTER IX.

VIGNETTE PRINTING-BLOCKS.

In the making of the vignette printing-blocks, as well as in that of the printing-boards, great care should be given to the materials used. The wood should be well seasoned, and the lighter it is the better, common pine or basswood answering very well for this purpose. The sizes of these blocks vary of course with the different sizes of the impressions on the negatives. For instance, blocks intended for 4-4 negatives should be in proportion to the size that 4-4 negatives are generally made.

The opening of the wooden printing-blocks should then be in proportion with the impression on the negatives, as has before been said. Now for the "whole size" The width of the opening should be 3 to 4 inches, and the length should vary from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches.

For the next size, larger head, 7 x 9, the width should be from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches, and the length from $4\frac{1}{4}$ to $5\frac{1}{2}$ inches.

For 11 x 14 vignette negatives the width should vary from $5\frac{3}{4}$ to $6\frac{3}{4}$, and the length from $6\frac{3}{4}$ to $8\frac{3}{4}$ inches. For 14 x 18 negatives the width should be from $6\frac{3}{4}$ to $7\frac{3}{4}$ inches, and the length from 9 to 11 inches.

The above-stated dimensions answer only for a trifle lighter background than the average; for with a darker one a dark piece of paper would have to be placed at the sides, and if the draperies are dark, then there should also be a piece at the bottom part of the opening, for without it the block, and consequently the halo, would be too large. For a lighter background than the one for which I have given the above dimensions the block, if anything, would be a trifle small. It is impossible, however, to give a fixed rule for the size of the different vignette-blocks, because there are a very great many things to be taken into consideration which renders it almost impossible. The only way is to be guided by good taste.

The depth of these vignette-blocks is probably about the most important part of the making of them.

The importance of duly considering their depth may be readily seen and answered by asking ourselves the following question:

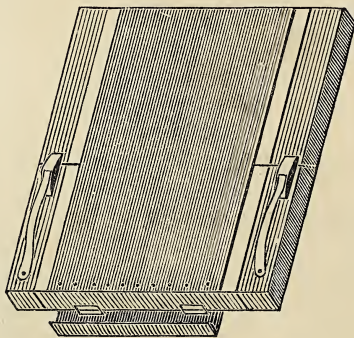


FIG. 19.

What is the object of a deep vignette-block? We answer: To make the halos soft.

These blocks should be deep in proportion to the size of the opening of the vignette of the block.

Thus, for a 4-4 up to an 8 x 10 size vignette-block the depth should vary from about one and a quarter to two and a quarter inches.

For 11 x 14 vignette-blocks, from two and a half to three and a half inches; and for 14 x 18 blocks, from three and a quarter to four and a half inches.

This is, however, very changeable, according to a variety of circumstances. For instance:

1st. The printing-board may be so made that the vignette-board when tacked to it would be very much raised, on account of the make of the printing-frame, then, of course, the block should not be quite so deep.

2d. The background of the negative may be very dark, or it may be very light. This refers more to the use of the board when printing than to the making of it; *for the negatives should be made for vignetting, rather than the vignette-boards for the negatives*; at least, this is so as regards the making allowance for the background of the negatives.

3d. The background may be faulty, so as not to admit of a large halo, but of a smaller, and as soft a one. In that case we sometimes have to make special blocks, but often there are other blocks, of a different shape, which will, with the aid of one or two "dodges," answer very well.

There are a number of cases in which the depth of the blocks for the same size negative should differ considerably.

The shape of the opening of a vignette-block should be like unto that of an ordinary hen's egg. The narrow end represents the head or upper part of the block and the wide end the lower part, because there should always be plenty of balance in a vignette, and that can only be obtained, as shown in Chapter XII, by having plenty of the body, and a good share of the shoulders in the vignette. In the making of these blocks the opening should be bevelled out quite a distance towards the under part of the block, all of the way from two to four inches, according to the size, so that it will not stop the halo from printing out, and thus occasion a sharp line on the print.

It is always an important item, in considering the making of wooden vignette-blocks, to have them as light in weight as possible, because, when the blocks are quite heavy, they are bungling to use, and their weight makes them dangerous to the safety of the negatives in more ways than one.

The weight then of the vignette-blocks, especially those of the larger kinds, can be lessened by tacking thick pasteboard to the under part of the wooden block.

In tacking this on, however, a part of the board around the under part of *the whole block*, and *beyond* where the bevelling of the opening stops, should be cut below the rest of the surface. The place cut should be from a quarter to three-eighths of an inch wide, and a *little* deeper than the thickness of the pasteboard which is to be tacked to the block.

The pasteboard should then be tacked to this under surface; *and the heads of the tacks should be below the level of the real bottom of the*

block, so that there will be no danger of breaking the negative, on account of the tacks being pressed against the brittle glass on which the negative is made. By paying especial heed to this, it may be of great value to the young beginner, and will perhaps be the means of preventing his breaking more negatives in the future. Of course the advantage of so doing will be and has been recognized by all printers throughout the country. There is no danger whatever to the negative from breakage by the use of vignette-blocks made as has been described, and there is also no excuse for bad vignetting with blocks *if the above is carried out*.

It will be seen by the perusal of the above that I have altogether omitted writing anything about a vignette-block smaller than a "whole-size," because, for those small sizes, I do not at all believe in using wooden vignette-blocks, as will be shown more fully in Chapter XII. Up to 4-4 size any way Waymouth's Vignette Papers are very superior.

CHAPTER X.

TREATMENT OF THE NEGATIVES BEFORE PRINTING.

BEFORE printing from the negatives they should be held up and *studied* by transmitted light, and if there is any way to improve them, then it should be done.

The skill required in printing from the negatives does not consist in placing them in the printing-boards, as received from the retoucher, and printing from them mechanically, by putting a piece of paper from the same sheet of sensitive paper on negatives differing greatly from each other, and then printing them all to about the same shade.

The negatives, to warrant this treatment, should be very evenly made as regards lighting, exposure, &c., and this is not a very regular occurrence in the best of photographic studios. The negatives, as they are received from the retoucher, should, to be sure, *in the majority of cases, be ready for printing without any further treatment of the printer*, but I have, however, found this to be a very rare occurrence, very often, indeed, seeing negatives which are faulty in some particular place, and which can be vastly improved by a little *doctoring* before printing.

This part of the printing is probably one of the most important, and the value of a printer is in a great degree determined by it.

It may be well to state here, that in proving the negatives, we only take out the most objectionable imperfections in the face, and leave the final retouching to be done by the artist, when they have decided on the negatives they prefer.

I will now take up separately the different parts of the negatives, and state the manner in which they can be improved.

THE BACKGROUND.

Often there are streaks (Fig. 20) running through the background which should be filled up with lead to the opacity of the surrounding parts, when these streaks are not as dense as the rest of the background when viewed through transmitted light.

Sometimes the background is very bad indeed, so much so that the pencil will not thoroughly remove the defects.

In such cases the negative, besides being printed in a small vignette to get rid of a great proportion of it, may have upon the back of it, over those transparent parts which are likely to be visible in the print, some transparent color.

I always use for this purpose some Prussian blue. This color should be laid over the necessary places in smooth and even strips; and then the background, according to how nicely this blue painting has been done, will print proportionately better.

Often "smoking the negative" is resorted to, which consists in moving constantly the back of the negative over a smoking lamp until the smoke has gathered on the negative to the right opacity.

Then, after removing the smoke that may be on the face, hands, and other parts of the figure, you proceed to remove it from that part of the background which prints the lightest on the print, leaving it on that part that prints the darkest, and then the smoke, if it is not too thick, will stop out about enough, so that the background may print pretty fairly in a vignette or illuminated print, as the case may be.

Always print negatives with bad backgrounds in vignette style if it is possible.

FIG. 20.



For extreme faulty backgrounds it is best to make another negative of the sitter if it is possible, and not resort to the "smoking," &c., unless it is impossible to obtain another one.

THE SHADOWS.

The Face.—The shadows of the face will now be taken into consideration.

In life, all of the shadows of the face are transparent, *i. e.*, there is always plenty of detail in them.

In a negative, however, this is often different, the shadows generally being quite black, more so by far in the majority of cases than they should be.

Under the eye there is often a heavy line, and over it a very heavy shadow, which in life does not show so plainly as it does in the negative, partly because they are flesh color, and because—unless the person is in direct sunshine—there is no marked contrasts between the light and shade, and even then, if we do not look for them, they are very seldom attracted by an eye unaccustomed to the studying of the different effects of light and shade throughout all nature.

In a photograph, where everything is either black or white, with proper gradations, these shadows and lines are more observable than they are in life, on account of their printing black.

These shadows, &c., to be *true* (at least as far as possible) to nature, should be removed more or less, according to circumstances. (Figs. 21 and 22.) The lines under the eyes should then be removed

FIG. 21.



FIG. 23.



FIG. 22.



in a great measure, in many cases (according to the age of the person, &c.), only leaving a *trace* of each line there, and they will then be as observable in the photograph as they are in life

The shadows under the eyebrows should then be very much removed, unless there has been considerable time given to the negative in exposing, and thus have obtained *soft shadows with plenty of detail*. As long as there is detail and softness to the shadows, there is never much need of having them lightened more than a mere trifle.

In lighting the shadows in printing, young beginners often carry it too far—so far as to make the prints in the neighborhood of the eye, or wherever the place may be, *look very flat* (Fig. 23), and thus have an equally bad result, but in another way. *About the eye there should always be a proper amount of shadow, so as not to make it look swollen.*

This lightening of the shadows can very nicely be done by stripping evenly or stippling some transparent color on the back of the negative, exactly behind the place to be lightened. As has before been said, we generally use for this purpose Prussian blue, which comes in little cakes, costing about seventy-five cents per cake. It is applied with a suitable brush wet with a little water, and upon which a little of this blue is dissolved. The thickness of this color can be determined only by a great deal of experience, and to blue-paint a negative nicely is accomplished only after considerable practice.

The lines between the eyes can be touched out best by the use of a Siberian No. 2 lead-pencil. In touching them, do not take them thoroughly out, *unless the scowl was occasioned by the strong light in which the sitter sat and is not habitual.*

There are sometimes very heavy shadows occasioned in lighting—"after the manner of Rembrandt" (?)—and these shadows are sometimes so very heavy as to be displeasing; then it becomes necessary to soften them.

This is done before printing, by placing a proper coat of "blue paint" on the back of the negative and over the whole side of the face. Considerable skill is required in placing this on so large a place, because *if it is not placed on even it will print spotty.*

Sometimes there are heavy shadows under the nose, chin, and often in the ears. Treat as above.

It is necessary sometimes to prepare the lights of the negatives for printing, although generally they are *doctored* during and after the time of printing.

For instance: very often the lightest side of the face will be too light when the shaded side is fully printed, and to prevent this it is sometimes necessary to blue-paint (as we shall hereafter term it) the shaded side as described above, so as to permit the light side to print without overprinting the shadow one.

Generally while printing, when the shaded side is done, *and there is some detail on the light side*, the print is taken off, and the blank, white side shaded or tinted a little in strong light, by permitting the light to pass through a suitable aperture, cut in a dark piece of

paper, on that side to be tinted. More of this further on. Let this remark answer for the present :

Never do the shading as last described unless there is some detail on the light side, because if there is not, the discoloring of the light side will flatten it very much, and thus be the means of ruining the prints. Your object is to *soften* a little, and not flatten a great deal, and as before said, there should be some detail on that side to accomplish the desired result.

In shading this side, a *very few seconds'* exposure to the sunlight will suffice.

INTENSITY.

In glancing through a negative the intensity of it is also to be thought of, because it is necessary to adopt a certain mode of treatment for such a negative, whether it is intense, weak, or medium.

An intense negative, as shown under the head of Printing Intense Negatives, is so called on account of the whites of the negatives, such as the face, hands, arms, &c. (when viewed by transmitted light) being quite *dense*; more or less so, according to the degree of intensity. Such a negative will yield prints that will be correspondingly light.

When the negative is too intense the whites of the prints will be what is termed "chalky," and if the exposure of the print is so far continued as to print in detail on those whites then the shadows will print too black, thus making a decided *black* and *white* print. This is, however, treated under the head of Printing Intense Negatives.

My object at present is to state the treatment of intense negatives before printing.

As such negatives should be printed quickly, they should not have any color on the back of them, to take out shadows, &c., as described above, because it will then be necessary to delay the time of printing them a little, to prevent this color from printing a harsh edge on the prints, as it will certainly do if the negatives are placed in the direct rays of the sunlight. Fill up these places, if necessary, with lead from the pencil on the varnished side of the negatives. If one coat of varnish will not take enough lead then varnish again with a *thin* varnish, and then this new surface will probably take all the lead that is necessary. If, however, this will not answer, then blue-paint the negative and print in strong sunlight, after having covered the printing-frame with one or more ground-glasses, and even with a tissue-paper, if it is found necessary. In printing intense negatives, print more for the shadows than for the lights.

WEAKNESS.

Weakness in negatives is the contrary to that which is described above, in relation to intensity.

Weak negatives are very thin, *i. e.*, they are semi-opaque, or have more transparent lights than an intense negative, and when held to the light, objects beyond can be distinctly seen through the densest parts.

Of course the rays of the sun would pass through such a negative more quickly than it would an intense one. *The beginner must remember that the quicker the light passes through the negative the less bold will the result be.*

The methods of treatment for such negatives are very numerous. I have frequently blue-painted the whole of a face and hands of such negatives (with the exception, of course, of the eyes and shadows in the former) so as to permit deeper printing of the hair, dress, &c., while the face and hands are printing, thus making the prints bolder than they would be if it were not done. This in a great degree prevents flatness, as the resemblance between the light, shades, background, hair, dress, &c., is not so noticeable. If the background prints about like the figure, the prints can be greatly improved by printing vignettes from the negatives.

Flowing these negatives on the back with yellow shellac varnish, and then scraping away those parts of the varnish which covers the hair, eyes, and the shadows under the chin, &c., is said to be very effective, as it permits the shadows and those parts of the negatives which should print dark to print a shade darker than they would have printed before this treatment.

Printing under yellow and blue tissue-paper is sometimes very good, but the prints do not work so well in the further operations as they would if they were printed under *white*, and not colored paper.

Printing under a ground-glass laid flat on the back of the negative, ground side down, or a piece of porcelain glass, or printing in deep shade, are all very good for weak negatives.

The advantages and disadvantages of what has been said about weak negatives and their treatment will be described more at length under the head of Printing Weak Negatives.

DRAPERIES.

One of the most important parts of a negative, to the ladies at least, is the dress, &c., and upon this often depends solely their liking or disliking the photographs.

Wrinkles in dresses, especially about *the upper part of the body*, are to be carefully prevented from printing, if the wrinkles spoil the beauty of their otherwise fine form. Never, however, touch them if they do not spoil the figure.

If the figure is a standing one and there are many wrinkles about the waist of a dress, caused by an ill-fit on the part of the dressmaker, they should be taken out. This can be done with the lead-pencil.

Does the lace-collar show well? If not, touch up the lace-work, or, better still, send the negative again to the retoucher and get *him* to do it.

All of these *little things* should be looked at by the printer before he prints from his negatives, and if there should be anything that you notice, and which escaped the notice of the retoucher, then you should *never* fail to get the retoucher to improve them, by a little more work, *before you print a single proof from the negative*.

Are the dresses in the negatives white? If they are, do you think that they will print well?

Draw your pencil along the tops of the folds, so as to make the dress print bold, by having some contrast between the lights and slight shades.

The above answers for a dress that has been about rightly exposed, but for an overtuned one, after the face, hands, &c., of the lady is printed enough, take a cloth, and, placing the negative-board out in the sunlight, keep moving it over those parts of the negative and let the dress print still more. This is sometimes a tedious operation, but a very good one.

The negative, if you choose, can be printed by placing first one thickness of tissue-paper over the whole negative, but on to the *outside of the printing-board* and over the head, hands, &c., of the negatives paste (if possible also on the board, but over the other tissues at any rate) several other tissues cut to the size of the places that you wish to prevent from overprinting, viz., the face, hands, &c.

These pieces of tissue-paper should be pasted on the other whole piece of tissue and *directly over* the places to be shaded. Do not place paste over all parts of the small pieces of tissue that is to be placed on the boards, but just touch the pieces sufficiently to make them stick to the rest of the paper. It is not necessary to have these pieces lay so very smoothly, and it will not matter much if the edges should happen to curl up slightly. Print face to the sunlight.

This treatment will permit the dress to print darker without the tedious operation of shading by hand the face of the negative to prevent it from overprinting. This is particularly advantageous when a dozen or two prints are to be printed from this negative, and all

the time and trouble that is required is only while printing the first print, as the rest of the order can be printed like a plain print.

After the order is printed the tissue-paper can easily be packed away in an envelope on the glass side of the negative, and thus saved for future use.

Dark dresses should sometimes be permitted to print after the face and other parts of the whites, such as the face, hands, &c., are done, so as to obtain fine, rich draperies.

Are there any tufts of hair projecting out beyond the head, and which you think do not look well? If there are, touch them out with the lead-pencil.

Are the frizzles on the lady's forehead regular, and do they look pretty?

Can the hair be improved in any other way than what has been mentioned?

Are the frowns removed as much as they should be, taking into consideration the age of the subject?

How are the deep, heavy lines in the face; are they all right?

The hollow cheeks, cheekbones, and the ears; how are they?

Do the veins on the hands and the cords in the neck need "doctoring?"

Since we have examined about all parts of the negatives before placing them out to print, we will watch and notice to see if the places *doctored* are properly done; that the prints are as *bold* and *brilliant*, yet as soft, as they should be, and if there is as much detail in the prints as we wish.

CHAPTER XI.

FILLING OF THE BOARDS.

THE simple process of filling the boards, as far as *teaching* it is concerned, is often very much neglected by the photographer in learning his apprentice to print.

This neglect on the part of his teacher of photography instils into the mind of the inexperienced printer a disregard of the importance of this mechanical operation, and thus quite often blunders, mistakes, and breakages of negatives occur, which is called *foolishness*, *heedlessness*, &c., by the photographer, and his apprentice is quite

often *cursed* by him for his stupidity. The apprentice is of course some to blame, but the photographer, unless he has fully shown the danger which would arise from not being careful in filling, is *equally* to blame, at least for the first or second accident.

When a young man first commences to print, he should *then* be taught the carefulness required in filling the boards, and in hopes that this chapter may arrest the eye of the young beginner, I have attempted to show in what respects carefulness is required.

I have said that this carefulness should be instilled into the mind of the young beginner when he *first* commences to print. There is an old saying; "It is hard to learn an old dog new tricks;" and although your printer may not be an *old dog*, yet it is applied to beings possessing more intelligence equally as well.

When a printer has learned to print carelessly then it is very hard to learn him carefulness, and consequently such a printer will always be making mistakes, all his life, however experienced at printing he may be. Such is partly the reason why every person who contemplates learning the photographic art should learn in a gallery where good work is done, for in learning how to make good work *carefulness* is also learned, which is always a necessary accompaniment. Now, the placing of the negative in or on the printing-boards is not altogether the *simplest* thing in the world, and in placing it in to print, please remember that glass is quite brittle and that it does not take much for it to break, and very often in letting the glass fall in the frames, after having placed one end in, causes it to break, on account of some slight flaw along the edges.

For this reason the negatives, before they are even retouched, should have the edges cut *clean*, providing they are not already so, as then there will not be so much danger of them cracking from uneven cutting.

The negative, if it be a trifle large, should *never be forced* into the frame to save a little trouble in cutting it, for they can never be forced into place, and either the frame or the negative will have to give way to the pressure, and the negative will most likely be the one. If the negative is a little short or narrow, or both, then a clean glass of the same size as the bed of the printing-frame should be placed in it and the negative on top of it.

Then if anything gives way, it will be the plain glass. It is always better in printing from negatives as large as 8 x 10, or larger, to have an extra glass in the board.

The dusting of the negative, to remove any dust that may have settled on it, should be accomplished by a wide, soft blender of camel's hair. To dust the negative, *never* lay the flat side of the

brush *horizontally* to the negative and then draw it along, for a great proportion of the dust will stick to the negative; but the brush should be held *perpendicular* to it, and the tips of the hair used briskly.

Dust the negative two or three times, and *immediately* after dusting place your paper on it before the dust settles again.

In placing the paper on, many printers spoil their prints by not placing it up high enough on the negative, and then again by placing it too high.

Paper with metal and albumen spots on it can be very often saved when the albumen spots are not too large, by placing that part of the paper containing the spots on the deepest shadow parts of the negatives.

In placing paper on vignette negatives, choose the very best, and never place paper on them that has the *water-mark* on it.

In printing such paper on any other negative, always have the water-mark on the darkest side of the background. As a rule, always place the imperfections of the paper—when you think that it can be saved—on the negative so that they will come *in all cases* either in the hair, draperies, if dark, or in the shadow parts of the negatives.

After placing the paper on the negatives, a cloth or two should be placed in. The reason why the cloths should be placed next to the paper is because better contact is secured thereby between the negative and paper. These cloths or pads should consist of white cotton flannel, *unnaped* side out, *i. e.*, next to the paper, as the other side often causes imperfect contact between the negative and paper.

They are sometimes glued to the back of the boards (*i. e.*, the backboards), and then they do not need more than a single pad in the frame. When there is another glass in the frame, do not use more than *one* pad, as the pressure of the backboard will be too strong for safety to the glass. Instead of cloth pads, thick blotting-paper may be placed next to the sensitive paper, and the cloths next to them.

There has, within two or three years, a novelty appeared of fuming these pads very strongly and placing them on the negatives, and thus fume the paper while printing. It is said by some to be very beneficial to the paper.

When fuming-pads are to be used, they should be fumed all night in a perfectly air-tight fuming-box, and then after they are used once, they should be placed back again and kept there while the fresh pads, which are removed from the box, are used. On placing

the pads on the paper, look to see whether there is any dirt on them, and whether there is anything on them that will spoil the paper.

If there are any tacks on the bench where the pads are laid down, they are apt to stick to the cloth, and if they are not examined closely and shaken before they are placed on the back of the paper, they will eventually break the negatives. In laying the backboards, with cloths glued to them, down on the bench, *never* lay the cloth side *down*, but always *up*.

After printing the first print, look closely at it, to see whether there is perfect contact in all parts of it.

In adjusting the pressure, always have it as *gentle* and *even* as possible, as strong and uneven pressure endangers the negative. Clean the back of the negative with a woollen rag, wet with a little common alcohol, before placing it out to print.

CHAPTER XII.

FITTING VIGNETTE-BOARDS TO THE NEGATIVES FOR PRINTING.

IN fitting vignette-boards to the negatives for printing, there are several things to be thought of and taken into consideration.

Due regard should be given to the background, for generally one side of it is darker than the other, especially when the lighting is after the so-called *Rembrandt*, for then it is generally the custom to have the background on the lighted side of the face darker than that on the other side, and *vice versâ*, so as to give boldness and vigor to the prints from such negatives.

When the background is as described, the vignette-board should not be placed so far on that side of the figure that has the darkest side of the background, because the vignette on the print will not be even, but one-sided. The vignetter should either be placed more over towards the other side, or if you do not wish to print so far on that side (the lightest), then you can paste a piece of dark paper on the vignette-board, in such a way as to cover up a great part of the dark side, and then upon printing it face to the sunlight, the prints from such negatives will be much better, being more evenly vignetted. Oftentimes it will not in every particular answer to paste this paper on *all* of that side, because it may make the drapery print badly.

When, in lighting his subject for the shadow effect, the operator allows the light and shade to act strongly on the drapery as well as the face, then the former will print light on the side where the background prints dark, and when we place paper on the dark side of the background to prevent it from haloeing out too far, we thus in a measure, if not careful, prevent this already light side from printing as much as it ought.

To remedy this, it is often necessary to cut out still further the vignette-board where the draperies are, in such a way as to permit all to print nicely on that side, without permitting the background to print out too far. Thus the outside of a vignette-board will often have a very bad appearance as regards the shape, sometimes having the shape shown in Fig. 24.

Upon looking through such a vignette-board on to the negative within, it would appear at first glance as though the vignette-board was tacked very carelessly on to the printing-frame, and not until we examine the negative by holding it up and looking at it, will we discover our mistake. In changing the shape of the vignette-board, it will be found to be a difficult thing to do if it should be found to be made of wood.

Partly for this reason, and partly because many negatives require a little different vignetter, I have always used common and average thick pasteboard for vignetting the common card and Imperial negatives.

For larger negatives, however, I use wooden vignette-blocks, and if there is anything needed to be done as described above, I make the print in the usual way, and before removing it from the frame, move the block in the direction needed, and shading the rest of the figure with a cloth, print it as required. As there are hardly ever more than two or three vignette prints to be printed from such large negatives, I prefer to do so, being less troublesome than to change the wooden block, and thus ruining them for future use; but for card and Imperial negatives, when there are often dozens to be printed, I like to have a vignette-board expressly adapted for that particular case, and then I can print right along, and finish the order without any more trouble, after having obtained the first satisfactory print.

Another advantage in using average thick pasteboard is because greater softness is imparted thereby to the halo of the vignette, if the pasteboard is raised to a proper distance from the negative.

The great disadvantage of many of the wooden vignette-blocks is

FIG. 24.



simply this : *The opening of the under part of the blocks is not bevelled out far enough for the purpose of obtaining soft halos to the prints.*

When we fasten such a vignette-block on to a printing-frame for vignetting, the under part of the block rests on the negative, and when the opening of the block is not bevelled out far enough, the diffused light will cause a too abrupt edge to the halo. This is the reason why soft halos are so hard to obtain with wooden vignette-blocks, and there are some printers who cannot obtain them, try as hard as they will.

On their informing you that they never could obtain soft halos, if you were to ask the question, "What do you use in vignetting?" their reply in most cases would be, "Oh! I have had some nice vignette-blocks made for me, but I cannot obtain soft halos, *even if I place TWO tissue-papers over the vignette.*"

When the block is not bevelled out far enough, the diffused light entering will cause the *sharp edge to print just where the block touches the negative.*

This can be prevented by bevelling the block out further, and also softer. The light, as it enters through the tissue aperture, will diffuse out almost exactly as far as you are able to see under the block by applying your eye close to the vignette-block and looking under. If, while looking, you see the edge of the bevelling of the block touch the negative, you can depend upon not obtaining soft halos until you remedy the defect in the blocks.

When you have new vignette-blocks made, test with your eye as above.

But softness to a halo cannot be obtained so nicely with a block placed upon the negative, as described above, as it can by the use of some common cardboard with an aperture suitable to the size of the negative.

In this case there is not anything to stop the diffusing of the rays of the sun, as there is in the wooden vignette-block, but the light diffuses out nicely and softly, the softness depending upon the distance of the cardboard from the negative.

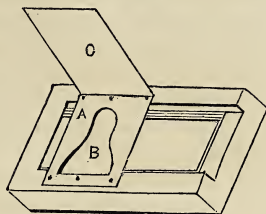
A few words about the distance of these vignette-boards from the negative:

Never place the cardboard nearer than a third of an inch from the negative, unless in case of some faulty place that is to be avoided in vignetting the negative.

If the figure is to be illuminated, so as to get rid of a defect in the background, then it is best to make a light proof of the negative, and cut close in and around the figure, being careful not to cut in too close to the neck, so as to give an ugly look to the vignette, which

will always look like the cut-out, although, perhaps, it may have a softer outline (Fig. 25). Place the outside of the pieces cut on to a suitably sized piece of cardboard, and cut out the piece B, which is cast away. Place the piece A over the background of the negative, about half an inch from it, *on to the raised outside of the printing-frame*, and after adjusting it properly, then tack it in its place. Paste a piece of tissue-paper C (French copying-paper is the best for printing purposes, being entirely free of the minute holes which are so characteristic with the English tissue) over the cardboard, so as to permit diffused light to pass through the aperture when you place it out to print in the diffused rays of the sunlight. If, upon examining the print, the halo does not blend out soft enough, then place the cardboard away a little more from the negative, and print again. If it blends out too far, place the cardboard a little nearer to the negative.

FIG. 25.



The manner in which I obtain these different degrees of depths from the negative to the cardboard without much trouble is, if the printing-boards are not raised in the making of them, to have made and ready at hand in case of need, some flat pieces of basswood, of *different thicknesses*, which can be tacked on to the sides of the frame when needed, and the cardboard tacked on to these. Have plenty of these pieces close at hand, and in tacking them on, do not use more than a couple of tacks for each piece.

If you wish to obtain a halo to a vignette that will commence close to the head to blend out, and extend out to the very edges of the card, both in the background and drapery, then the distance of the cardboard from the negative should vary from a half to a full inch. The opening of the cardboard should be about the ordinary size of a vignette aperture.

The greater the distance from the negative to the vignetting arrangement the smaller should the opening of the vignette be.

Never use ground-glass in vignetting when you desire soft halos; but tissue-paper should be used, and a good quality at that.

Always be sure that the head of the negative is balanced by having plenty of the body show. In your mind's eye draw a line from each side of the face down through the body. The shoulders should always show from a third to a half of the *length* of the face beyond this imaginary line, and the length of the body should rarely be less than one and a quarter times the length of the head.

There are many things sometimes to prevent having the above-named proportion to the vignette, but always have it if possible.

The Waymouth Vignette Papers are undoubtedly superior to anything that has ever been devised for the purpose, and any failures in using them have no doubt arisen from the want of proper care and judgment on the part of the printer, rather than any fault in the papers, or the idea on which they are gotten up. Of course all negatives cannot be treated the same in this respect, any more than all can be printed equally well on one sample of silvered paper. A negative with a light background may print well with the vignette paper placed in contact with the glass, while one that prints a dark ground would require the paper to be separated from the glass a sufficient distance to prevent its printing a hard or abrupt edge to the vignette.

A little consideration in adapting these papers to the quality of the negative will soon enable any one to use them successfully, and I believe with more uniformly good results than with any other method of vignetting that has ever been practiced.

They are adapted to all sizes up to 8 x 10, and their cost is less

FIG. 26 A.

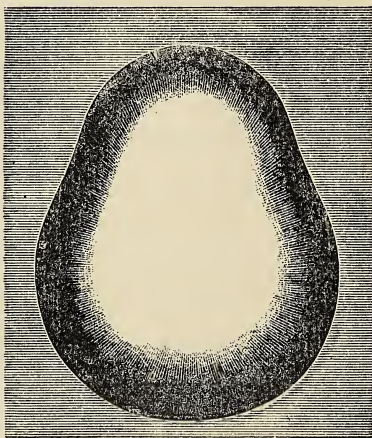
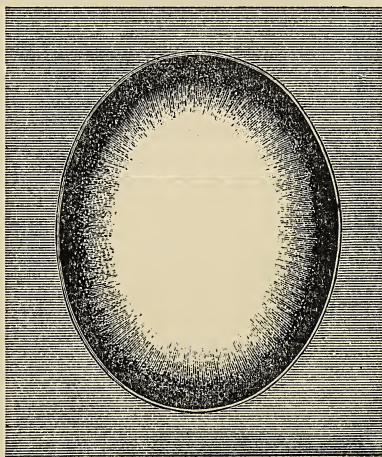


FIG. 26 B.



than any other method that will do the work as well. They are made both "pear" shaped and oval, as shown in Figs. 26 A and 26 B, and of yellow and red bronze color, and of black, to suit the

varying intensities of negatives. They are very tastefully and skillfully gotten up by the manufacturers.

Before closing this chapter I will attempt to state what the beauty of a vignette consists in. Sometimes vignettes are meant to supply the place of shadow—as when in photographing *crosses*—then we vignette in such a way as to have a shadow on one side of it. (See Fig. 27.)

The beauty of such a vignette consists in the artistically printed shadow, and when we examine such a print, we experience considerable pleasure in seeing the soft shadow caused by the cross, whereas if it were not there, or the shadow were on both sides, it would create anything but pleasure.

Then again, the beauty of vignettes in ordinary portraits is the soft blending from quite dark, in the drapery and close to the figure in the background, to a very soft and almost indistinguishable edge on the outer part of the *carte de visite*, for which, and the *Imperial* this style of vignetting only is advisable.

FIG. 27.



CHAPTER XIII.

MEDALLION AND ARCH-TOP PRINTING.

THESE are very popular styles for printing from the negative, both on account of their beauty and because by their use the photographic printers are enabled to prevent defects in the negatives from printing.

These are advantages which we sometimes have, and for which they are peculiarly adapted.

For instance, a negative with a *black* velvet background is broken along the upper part of it in one place, and in another part of the plate it dried before exposing.

These defects are in such a part of the negative, that a proof printed from it *plain* cannot be trimmed unless these defects show, so much as to spoil the otherwise fine print. Such a negative then

cannot be printed plain, and since vignetting it is not a very easy thing to do, on account of the very black background, we can most advantageously print it in either the medallion or the arch-top style.

Besides the above, there are hundreds of cases in which the use of the medallion and arch-top are indispensable.

To some the making and use of the medallion and arch-top are a source of continued trouble and vexation, and the successful photographer is very often hearing complaints from his less skilled brother photographer of his inability to make and use them satisfactorily. The reason of this is because he is careless as to what he uses in making or cutting them out, and not using them rightly after they are made.

Mr. John L. Gihon, a well-known photographer, knowing the difficulty which many have experienced in the making and use of the medallions, has made for the trade some very fine medallions and masks or cut-outs of different sizes. To those who are unable to make them for themselves, or those who prefer to buy rather than to make them, we recommend the use of his, believing they will fully meet the expectations of the purchaser.

The common card oval ferrotype mounts are very often used by some photographers in the making of the medallion and mask.

Some use a knife and cut around on the inside of the mount, but as the soft cardboard is very readily made nicky, and thus gives this nicky appearance to the cut-out, this way of making them is not advisable. It is better to buy such as are neatly made, like Mr. Gihon's.

In the place of using a knife and cutting around on the inside of the mount, some place this mount on a piece of sensitive *plain* paper and print the inside of it quite dark, thus leaving the unexposed part of the paper white.

After cutting a little on the circumference of the dark inside with a sharp knife, the rest of the mask is carefully cut from the medallion with a pair of shears, the point of which is pressed through the aperture made by the knife. The cutting of the medallion and mask in this manner requires a very steady hand to have the result of your labor worth using.

In making the medallion, or arch-top, I have always used brass mats of different sizes. These mats or guides are perfectly even and true, and are made of metal, so as to permit the knife being used around the inside, without any material damage to it, if only ordinary care is exercised in its use. The "cut-outs" are made of different sizes.

The regular size for ordinary card work, when the head is not the

so-called "Berlin," should be $2 \times 2\frac{3}{4}$ inches oval. A size smaller is used when we do not wish to show as much as in the other; size, $1\frac{5}{8} \times 2\frac{1}{6}$.

A size very much used for small heads is $1\frac{3}{16} \times 1\frac{1}{4}$.

One of the most convenient of all of the different sizes is $\frac{7}{8} \times 1\frac{1}{4}$. It is most excellent for the purpose of printing negatives of babies, taken sitting in their mothers' lap.

A *carte arch-top*, size about $1\frac{1}{8} \times 2\frac{3}{8}$ inches, is about the only size or style arch-top that is used for the *carte de visite*, and for other sizes your taste will dictate, such as the Victoria or the Imperial.

Common yellow envelope-paper is best to make these medallion and arch-top cut-outs of, as this paper utterly excludes all light that will discolor the sensitive paper. If you prefer to use sensitive paper that is not fit for printing purposes always use the *plain* and not the albumen paper, because the latter will curl up considerably, so much so as to make it very troublesome to handle.

When you have selected your paper, and have laid it on a glass, then place your brass mats on the paper, and with a sharp knife cut a *quick, clean, and even* cut around the opening on the inside, leaving sufficient paper on all sides of the mats for the purpose of masking the sensitive paper in printing the different sizes, such as the *carte de visite*, Victoria, Imperial, or larger sizes, as the case may be.

In cutting the last part of the medallion or arch-top considerable care should be given to see that the knife enters in at exactly the place where you first commenced to cut, because often at this part of the cutting there is apt to be a nick in the cut-out, if it is not carefully guarded against.

The cutting out of these medallions and arch-tops may probably be very difficult at the first few attempts of the beginner, but if he perseveres he will find that a little practice will soon enable him to do it successfully.

Every mask or inside will fit its own medallion or outside (i. e., the one that it was cut out of) better than it will any other one, and if the printer will remember this I do not think he will ever meet with anything but good results.

When the cut-outs are cut, and *before they are moved*, they should be marked in such a way that the printer can find the mask that was cut out of any particular medallion at will, for this is *absolutely necessary* if he wishes to obtain beautifully shaded lines on his prints.

The way I always do this is to mark on one end of the medallion H, which means the head of it, and directly under it some name by means of which I can easily tell it from the others of the same size.

On the *same end* of the mask, and on the *same side* of the paper, we also mark H, and directly under this the name which was written on the outside from which the mask was cut.

To explain more understandingly what I mean, let us suppose that we have finished cutting a medallion and mask and that they lay before us just as cut.

Now, on the upper part of the outside we will mark H, and directly under it, and also on the outside, "Heathen Chinee."

Now, also, on the upper part of the mask we mark H, and under this "Heathen Chinee."

I will remark here that it is very essential to have the marks on the *same side* of the paper, and also at the *top* of each. The importance of this will readily be seen further on, when the crescent line is to be shaded on the print.

I spoke above about care being exercised in making cut-outs; that the knife enters in at exactly the place where you first commenced to cut, because often at this part of the cutting there is apt to be a nick in the cut-out if you are not careful to avoid it.

In laying the outside on the negative to print from, *always lay the side marked H up and close to the negative, leaving the unmarked side of the paper for the sensitive paper to come in contact with.*

In laying them on considerable care and judgment should be exercised, so as to give a proper balance to the position and proportion to the print.

The principal faults that occur in laying these medallions and arch-tops on the negative for printing are:

1st. The head is apt to be too high up, or too low down, in the medallion or arch-top.

2d. The body looks as though it was either falling backwards, forwards, or sideways.

The nose or the mouth, as a general thing, should be in the centre of the opening, although this is, of course, open to exceptions.

To avoid the necessity of having to place the medallion on the negative for every print, I stick the corners on the negative by means of a very little of a thin solution of gum-water. I use it thin so that it will readily come off when you wish it, but will adhere to the negative without any trouble or danger of slipping while the boards are being filled. In case it does not come off, dampen the place a little with your tongue.

In sticking the medallion on to the negative, only stick it by the *extreme tips of the two upper corners.*

Now, a print having been printed in the medallion, which we will

suppose to have been the Heathen Chinees, we will proceed to shade the crescent line on it.

Take a nice piece of glass of suitable size, care being taken that it has no bad bubbles in it, and lay the *marked* side of the mask on it, after having previously wet the *centre* of it with a little gum. The drying should not be hurried up over a flame unless the paper with the glass is *under pressure* in the printing-frame, because it is not apt to dry *smoothly* unless it is done in that manner.

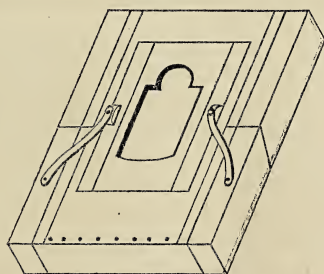
The air-bubbles between the surface of the paper and that of the glass should be rubbed away with the finger before drying. In laying the gum-water on the paper do not touch a place larger than the nail of a little finger.

When the gum on the paper is dry the glass should be cleaned on both sides, and then laid on the print that is to have the line shaded on it, the whole of which is then to be laid on a flat printing-board. (See page 70.)

There is considerable difference of opinion as to which side of the print the line is to be shaded, but the majority of photographers agree that it ought to be on the side of the darkest part of the face, so as to give brilliancy and vigor to the print on account of the contrast.

The size of this line varies according to the intended size of the finished print. (See Fig. 28.)

FIG. 28.



Avoid large lines on *cartes de visite* prints.

On large prints, such as 11 x 14, &c., a proportionately large line is wanted, and when done nicely the effect is really beautiful. The size of the line on these prints, 11 x 14, should not be more than one-fifth, or less than one-tenth of an inch wide at the widest part. For 14 x 18 the size should vary from one-fifth to one-fourth of an inch wide at the widest part. For Imperial cards the size of the

line should be about one-twentieth of an inch; and for the small cards the size should be about one-thirty-second of an inch wide.

Having determined as to which side of the print the line should be, the *exact place* on the side is governed by the direction the light falls on the face, and which is only ascertained by the *studying* of the negative or print.

The way I should advise the beginner to shade the crescent line is as follows:

Lay the inside or mask on the print so that it will cover exactly every part of the printed picture, leaving only the white outside exposed, which, if you were to imagine the medallion or arch-top to be laid exactly on the print as it was in printing it, you will see that the *mask lies exactly in its own medallion or arch-top* as it did when it was cut, and consequently a splendid and true line can be obtained. In laying the mask on the print, always have the end marked H up to the head of the print, since the end marked H of the outside or medallion was placed at the head part of the negative in printing the print.

Always bear the above remark in mind, and considerable annoyance in printing these styles of prints can be saved.

Now, as you have the mask fitted exactly on the print, try in *one* move to place the mask over in the direction you have decided upon having the crescent line appear.

In moving this over there will be a dark line on the other side of the print, which should, in all cases, be *exactly as large as the intended white line*. *Bear this in mind*.

The reason why you should be careful and have the mask placed over in the right direction in one move is, because you will be more apt to have *both lines alike*, which, if the mask lay in a different direction from what the outside did in the printing, the result will not be so good. *It is for this reason that I have advised the beginner to have his mask fit the print before he moves it to shade the line, and also to move it in one move, as this will give the desired result without fail*.

The required shade in printing the border of the print is ascertained by looking at the background, and then permitting it to darken *as near half way between white and the tone of the background* as you can judge. Many photographers prefer to have it tinted very slightly.

If the background is *very light*, then print the outside *black*.

In shading the print never let the background and the border be of the same shade, for it will make the print appear flat and feeble. Failures in this direction are as common in medallion printing as bad

and irregular lines, and a printer who does not take care to prevent the one, rarely does the other, for they generally go together.

I do not give the above as anything *entirely new*, but judging from the very bad, irregularly-shaded medallions and arch-tops that are too often seen, I think it could be adopted by many with profit.

CHAPTER XIV.

FANCY PRINTING.

FANCY MEDALLION AND ARCH-TOP PRINTING.

THIS fancy printing is sometimes very beautiful when the designs for making them are neat and pretty.

In selecting designs for this work be guided by good taste, and do not strive after *complicated* and *glaring* designs when the *simple* and *delicate* ones are always the object of the tasteful printer.

There are very few designs for this fancy printing more beautiful than that of the fine parallel lines that we are so familiar with in the French writing-paper. Besides the parallel lines, a few others of a delicate design are used very appropriately. Always have the size of the intended prints and the fancy design in *harmony* with each other, *i. e.*, the larger the size of the print the larger should the design be, and *vice versâ*. It would be ridiculous to have large designs intended for an 8 x 10 size photograph used on the common card, as well as it would be to have small designs on large prints.

I have seen a few frame photographs printed in the fancy arch-top and medallion style that I liked very much, because the design for this fancy work was so very appropriate for the size of the print.

Generally speaking, however, these designs are intended simply for the *carte de visite* and the Imperial; sometimes, too, for the Victoria when that style print is made, but they are very seldom used for anything larger.

The making and use of these medallions and arch-tops intended for this style of printing are exactly the same as was described in the preceding chapter, with the exception of the placing of the paper, with the design upon it, upon the print, and then shading the line upon the print by means of the inside mask, as usual.

There is also another way, which will be described further on.

The paper suitable for this work is known as the French writing-paper, the thinnest of which should be obtained. Figs. 29 and 30

FIG. 29.

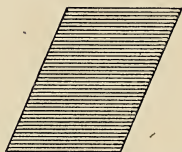


FIG. 30.



represent some of the designs. A sheet of two or three different kinds will answer very well for a beginning.

Cut the sheets up to the proper size, and after placing your print upon a flat printing-board, put one of these different kinds of designed paper over the whole print, which will be almost entirely covered. Now take the *proper mask* and proceed to make the crescent line on the print. This is rather difficult at first, owing to the very indistinct print under the white writing-paper, which thus renders the shading of the line rather troublesome. By *pressing* the white paper in close contact with the print underneath in laying on the mask, and going to a part of your printing-room where you can plainly see your work, you will find that you will have no trouble whatever.

In printing this *outside* let it darken to the same shade as you would in making plain medallions and arch-top prints; and what I said in regard to plain medallion-printing, about tinting the border to the same shade as the background of the print, is also applicable in this style of printing, the result being equally as bad, with the exception, perhaps, in this case, that there will be a kind of a *fancy flatness* to the prints, instead of a plain one.

Besides the above, there is also another way to print these which is, perhaps, easier, because the French paper can be dispensed with, as the glass to which the mask is stuck answers the place of the paper.

A *very thin* negative indeed is made of, say some moss, and developed, fixed, washed and varnished as is usual in negative making.

The masks are attached to the *face* of the negative, but it would be better if they were not stuck at all, for the negative will, in a short time, be ruined by so doing, and after adjusting the mask the whole is then placed out to print as in ordinary plain medallion-printing. The negative being very thin, the border will darken very rapidly, as quick, if not quicker, than when French paper is used.

PRINTING IN GRAY.

This term is generally applied to photographs which have been, or are to be printed first in the vignette style, and then the surrounding white border has been, or is to be, printed or tinted a little. The whole appearance of the mounted print is very often quite pleasing, the darker draperies, &c., of the print being of a rich warm tone, while the slightly tinted border will be of a "*gray*"-ish tone: When skilfully done, this "printing in gray" is a good thing, and serves to give variety to the printer's results instead of the monotonous appearance they have in some galleries.

In the first place, in the vignetting of the negatives that are to be printed in this style, do not show too far down in the draperies, although considerable halo may be shown around the head.

The reason why the draperies should not be printed too far down is, because in tinting the border the action of the light on the white sensitive paper *develops the print* in a measure where, in the first place, nothing of the draperies were visible. Bear this in mind.

While the tinting of the border of the vignette print is carried on, the lights of the print would be very much discolored if they were not protected from the white light, and consequently a cut-out or mask is made, which answers the purpose admirably. To make this mask, cut a piece of spoiled sensitive paper a *very little* smaller than the figure, as regards the hair, dark draperies, &c., but not a particle smaller in regard to the face. Do not cut too far down in the draperies, or in tinting the print will be spoiled.

The print to be tinted, having been removed from the vignette-board, is then placed in a flat printing-frame, in which a clean glass has been previously placed. Another glass of a larger size is then obtained, to the under surface of which is attached this cut-out, and then, placing the glass so that the cut-out on it will cover the figure in the print, we commence to tint the border of the print, keeping, in the meantime, the glass constantly on the move. It will take about five to ten seconds to tint all that is required.

In moving the cut-out during the tinting of the border, be sure that no part of the face is so exposed to the light as to discolor it.

Always be careful not to tint the border so much as to occasion flatness. A very little tinting is all that is required.

Cotton is generally used by experienced printers in place of cut-outs, but I should not advise the beginner to attempt it until he has had several months' experience in printing.

CHAPTER XV.

*VIGNETTE CAMEO AND MEDALLION VIGNETTE
CAMEO PRINTING.*

To print these beautiful styles a negative should be made expressly for them, having an ordinary size figure, somewhat smaller than the "Berlin head."

To print in cameo, the same idea holds good as in printing medallions, &c., *i. e.*, to show *sufficient* of the body to balance the head, but very little more.

A ring made as described below, and called a "cameo ring," should be stuck to the negative that is to be vignetted by the extreme corners, as if you were to print it in the ordinary medallion style, and after placing the sensitive paper on it, the negative is then ready to be vignetted.

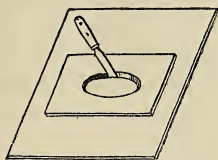
In choosing the vignette-block, or in making the cardboard vignetter for it, bear in mind that a much smaller one is needed than if it were to be printed in the ordinary vignette, and consequently pick out such a one as will show enough of the body to balance the head, *and no more*, although we might, if we were not printing this style, choose a block that would blend the print out to the very edges.

The reason why this should be heeded is, because the finished vignette print, when pressed by the cameo press, ought not to have any of the halo show beyond the pressed-out surface, if you wish a very fine effect as is then the case, and the ring being placed on the negative, prevents the halo from printing out further than where the ring is placed, and since this ring is made from the cameo press itself, it will, of course, when carefully pressed by it, give us the effect we wished, *viz.*, all of the printed paper is pressed forward while the white border retires. It is almost needless to state that the halo should blend out quite softly, both in the draperies and elsewhere, so that there will not be a harsh appearance in the print, on account of its being stopped abruptly, hence the need of a small but deep printing-board and a piece or two of tissue-paper (according to its quality) for blending it.

In making the medallion vignette cameo, proceed as above, with

the exception in the above case, that whereas the print is finished as regards to the printing when it is removed from the board, in this case there is to be an outside or border printed in, which may be of a variety of shades, as circumstances may permit. In making the cameo ring, place the die of the cameo press on a glass, with the paper that you are to make your cut-out of placed under it, and then with a sharp knife (Fig. 31) cut a quick and clean cut all around the inside of the guide. (See page 67.)

FIG. 31.



In using the cameo ring, proceed as if you were printing the ordinary medallion, and in shading the outside, bear in mind to use the right mask for the cut-out used in printing the prints. (See Medallion and Arch-top Printing.)

If the background is very light the border should either be lighter or darker, but *never* of the same shade.

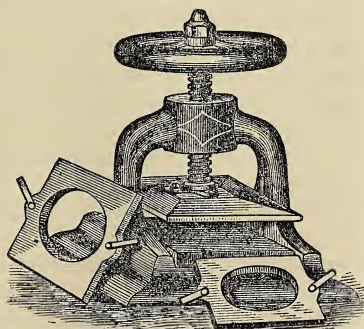
When the prints made are *medallion cameo* and are not printed in the vignette, then the background is darker than what it would be if vignetted, and consequently the border can be printed lighter than the background, but when, as is very often the case in printing the prints in vignette, the background is very light, then the border is generally printed until it bronzes, so as to give a decided contrast; this produces an effect quite pleasing.

A new (or revived old) style, more especially for the Imperial card, but can be used in the smaller card printing, has lately come in vogue. The negative is printed in a vignette, feathering out very softly, until the medallion which was previously placed on the negative (varnished side) stops it, but *very faintly* so, and then a faint border of the *same shade* as the *very edges of the halo* is printed, and the print when finished is very fine.

The exposure to the light, when printed as just described, should only be about *two to three seconds*, a second more often spoiling the print.

There are a number of cameo presses in the market. Fig. 32

FIG. 32.



represents Chute's Universal Cameo Press, which is adapted to cabinet or Imperials as well as cards, and is the best.

The beauty of the above styles of printing seems to be generally acknowledged by at least the patrons of the galleries in which I have printed, if one might be allowed to judge from the orders that were continually being given for them.

CHAPTER XVI.

PRINTING THE BENDANN BACKGROUNDS.

OF all the improvements within the last year or two, in the printing department of our art, nothing excels or even equals that of the use of "Bendann Brothers' Backgrounds," for the merit of which "The Holmes Medal" was awarded to them by the National Photographic Association, at their convention in St. Louis, Mo., in 1872. The simplicity and convenience of using them, as well as their great beauty, insured for them at once a hearty welcome, and it was not a long time before they were in use in the printing department of the leading galleries in the United States. There are many designs, and among them a great variety of interiors, such as drawing-rooms, libraries, &c., and some of them with beautiful paintings on the walls are very noticeable.

The inexperienced printer is troubled a little when he first commences to use these background negatives, and for the benefit of such ones who may not understand the *modus operandi*, I have entered quite minutely into the details of using them.

The public admires and "want the Bendann Backgrounds," and if business is dull, this will refresh it.

In making the portrait negatives for this kind of printing, do not have the background either too dark or too light; a medium light ground is best.

When you have negatives with rather a light background, select a Bendann Background that is not quite as decided in its contrasts about the centre as others may be, such as some negatives of libraries that I have seen; providing said library is suitable to the idea to be conveyed.

As to the artistic results that can be obtained by the use of the

backgrounds, let us notice a couple of instances which will, I think, illustrate what we wish.

Would it be appropriate to select a library background when the figure is that of a gentleman reading?

A gentleman and lady in outdoor costume, standing conversing, he toying with his cane, she picking a flower to pieces—would not some one of the exterior backgrounds answer capitally?

There are a great number of cases in which these backgrounds can be used with artistic results, but my space will not permit me to dwell further, and I will pass over this part with this remark, that the artistic photographer can indulge in a few such positions as promenading, conversation, reading, meeting of friends, collection of gossips, &c., with a plain woollen background, and backgrounds either interior or exterior can be printed in, suitable to the dress of the figure and the idea to be conveyed in general, with such effect as to make the finished print look like (what it surely is) an artistic photograph.

In preparing to print these backgrounds, first print the sensitive paper under the negatives until finished, and then remove them from the frame as you would do if there were to be no backgrounds printed in. Print the number of prints wanted and *one* extra. This extra print, which can be the *worst* print of all, is then used as a cut-out for use in the printing of the "Bendann Background."

In cutting out, observe whether the dress, draperies, &c., are light or dark, and if light, cut in all around, but exactly on the edge of the figure down to the floor, *leaving the floor in the cut-out*.

It may be worth mentioning here that the floor of a print or negative—whether they are copies or life—should *never* be taken out, or the resulting prints will in every case be worthless.

In cutting out the print mentioned above, if the draperies, &c., are dark, then cut a *little inside* of the edges and all around the figure, with the exception of the face, hands, &c., which should be cut as all light things should be, *i. e.*, on the line.

Do you remember when you were children, how you would cut the pictures out of your picture-books, and how careful you were to cut them, as you then termed it, "on the line?"

Do so in making the cut-outs with light draperies, but with dark draperies a little inside is best, for since they are dark the background will not be likely to show in on the drapery of the prints so as to be at all noticeable; only cut, however, the least trifle inside when cutting the draperies, although more freedom is given as regards the hair, if dark. Spaces between the arms, legs or two figures should be cut out.

The suitable background negative being selected, the cut-out is placed on the *back* of it, and the sensitive side of the paper *outwards*, and then, when a print is laid under the background negative, the cut-out and print will lay in the same position, since they both are face up, and consequently all parts of the cut-out will fit the print.

The centre of the head of the cut-out should be laid on the glass side of the negative, allowing the edges of it to curl up slightly, and a weight or knife laid on the cut-out will prevent it from curling up during the printing of the background.

If there are panels to the doors of the interior backgrounds, allow the floor of the cut-out to run parallel to the cross panels, *i. e.*, those panels which run parallel to the floor. Heed this last remark, and when you have learned its importance, you will see the value of it.

Now substitute the background negative for the portrait negative, adjusting it properly in place. Then place the mask on top of the background negative, and a weight on the whole to prevent slipping. Some parties use paste, but a weight answers as well and is easier.

For instance, if the figure is with *dark* draperies, and you have, as per advice given above, cut a trifle inside of the draperies in making the cut-out, then the print should be so placed that you can see a trifle all around the edge of the cut-out by looking directly at the light, and then you should place all in a shallow printing-frame, *without moving it from its present position*, and fasten the backboard in. A little practice in placing these negatives and prints in the frames will soon enable you to do it without moving the print or negative in the least from their relative position.

If, however, the figure of the print is in a *light* dress, such as a bride in her wedding-dress, and the cut-out is cut as has been advised, *then the print should match the cut-out in every particular*, and a background chosen that will, of course, have no heavy lines in it that come in the neighborhood of the dress, veil, &c., because these things being so very light the diffused rays of the sun will penetrate under the edge of the cut-out, and if there are such lines they will be likely to print on the dress, &c.

An experienced printer, however, can use such backgrounds without having these lines show in the least on the dress. I should advise the beginner always to choose a background negative that is rather intense at the centre, as some are purposely made, and then there will be no danger of these lines showing on the figure.

In placing the print on the negative there are several points

worthy of notice here that should be looked at to see if they are correct before placing the negative out to print.

Look to see whether the face of the cut-out is cut as it should be, *i. e.*, *never inside*, but always on the line, unless there is hair on the sides of it, and then it should be cut a trifle inside of that hair. Then come the shoulders and arms, especially if they are about bare, and then finally look to the dress.

I said above, in making the cut-out, to cut with a little more freedom about the hair, and I will here state why.

Sometimes there is a little light place on the printed-in background, either just above the top of the head or by the side of it, generally the former, which is occasioned either by the print being placed on wrong, or by the cut-out shading said places of the background during the printing. The reason why it shades is because great pains is not taken, while it is exposed to the light, to have the negative-boards *exactly* face to the strongest sunlight, but it is generally allowed to slant in that direction which the light place on the background may indicate. In the greater number of cases the hair is quite dark on the top of the head, also on at least one of the sides, if not both, as a gentleman with thick wavy hair and full beard. When the hair is as just described then you can, if you wish, cut quite away inside, say from one-twentieth to one-thirty-second of an inch, for when the hair is dark it will do no harm, and will then prevent the shading of the background in printing.

After you have placed your print in the right position on the negative, and have fastened the back to the printing-frame, you are then to print in the background, which is accomplished by placing the printing-frame exactly face to the sun (see page 82), and keeping it constantly in motion by gently moving it from side to side and from top to bottom, care being taken that it is constantly kept in motion.

In cloudy weather several negatives may be printed at once, taking care to frequently turn each one.

Unless the background negative is made as some are, with the centre of it a little more intense than the border, it will as thus printed give to the figure a sunk-in appearance, as though it were too close to the background, as in ordinary negative-making. To overcome this defect we make another cut-out, roughly cut from a card-board, with about the same shape as the cut-out on the back of the background negative, but *considerably larger* than that, so that when it is held up before the cut-out on the negative it will overlap on all sides of it for the space of half an inch or so. This rough cut-out is held with one hand about the space of a foot from the negative, so that it will shade the cut-out on the back of the negative. This last-

mentioned cut-out, intended to shade the figure of the print, should always be kept in a brisk motion by means of the right hand, while you hold the negative-board *face* to the sunlight with the left hand. The *direct rays* of the sun will fall on that part of the negative that this rough cut-out permits it to do, and only the *diffused* light is permitted to print the background in close to the figure, and the diffused light not being so strong as the direct, it will, as a natural consequence, print lighter at that part where only the diffused light is permitted to go than where it is not, and the finished print will have a decided air of relief, on account of the toning down of the background as it approaches the figure.

Some may criticize this on the ground that the diffused light would not permit the background around the figure to print hardly any before the border would be plenty dark. These background negatives are quite thin, and in *strong diffused light* (which would be the case if the pasteboard were held at some distance from the negative) the background around the figure will be permitted to print some before the outside is done, but if upon examination of the print before it is done it should show that this part of the print would be too light, then expose the whole thing without the rough cut-out to the full sunlight, and permit it to remain there for about a minute, keeping the board in a gentle motion in the meantime, and then finish the rest of the printing in of the background with the aid of the rough cardboard cut-out.

Instead of making this *extra* cut-out for every different pose that has to be printed with a "Bendann Background" I use a handkerchief, and by the aid of the fingers of my right hand I contrive to fasten it in the shape I wish, with but little trouble and considerable saving of time.

Vignetted grounds, especially for outdoor scenes, are very beautiful and stylish. The vignette is made as usual; proceed as above, only relieve the ground; in printing in, vignette the edges. Vignetted grounds are best printed in the shade, as they do not require strong printing in.

As to the depth of printing these backgrounds, attention must be given to the style of the print, &c., and then let your own taste be your guide.

CHAPTER XVII.

PRINTING INTENSE NEGATIVES.

THESE negatives generally print "*chalky*" in the lights, and "*inky-black*" in the shadows. In a negative that is too *intense* there is scarcely any detail whatever either in the high-lights or in the shadows. Such a negative then will yield what may be termed bold and vigorous-looking prints, and will in many cases suit the customers, especially some ladies who like to see their faces *very white*.

To a well-educated person nothing is more repulsive, in the way of photographs, than the harsh black-and-white pictures, without any of the *fine detail* either in the lights or shades, which are now so universally admired. The contrast between the lights and shades in such a negative is too great, and consequently it should be toned down or softened.

It is well known among most printers that the *slower* a negative prints the more *contrast* there will be in the resulting print, and *vice versâ*. *Such a negative, then, should be printed as quickly as possible.*

A too sensitive paper will make the contrast all the greater, and our object in this case, then, is to have a paper silvered in such a manner as to obtain a print less harsh than would be obtained in the ordinary way of working. Paper, then, should be silvered expressly for such negatives, and kept separately from the rest, for the paper which would produce fine prints from intense negatives would produce miserable ones from weak negatives.

The paper should be silvered only a very few seconds on a weak bath (say from fifteen to twenty seconds on a 35-grain bath for the Berlin brand of paper, for the Hovey brand fifteen seconds on a 25-grain bath, and for other brands say thirty seconds on a 30-grain bath), and fumed just long enough to prevent it from printing the objectionable red color, which is sometimes quite difficult to manage in the after-operations.

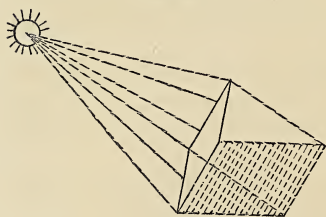
After fuming, if the paper is damp, dry it, and then after cutting it up to a suitable size for printing, place it in a box which is labelled "Paper for Intense Negatives," and always use this box for this brand of paper, and then there will be no danger of mixing it with the differently timed silvered paper which is used for printing other kinds of negatives.

We always use the *pink paper* for intense negatives, for the color of this paper is of great benefit to the print, as after it is mounted there will be a delicate pink or flesh color to the high-lights, which will look very much like the flesh, and consequently will tend towards giving the appearance of detail in those parts of the prints that print *chalky*, such as the face, hands, &c.

After having filled a negative-board, containing one of these intense negatives, with a piece of the paper which was prepared for it, we will place it out in the *sunlight* to print.

The more direct the rays of the sun fall on this negative the quicker will it print, because the light will be correspondingly brighter. This is the reason why, when we place a negative out to print in the sunlight, it prints quicker than when placed in the shade, and when placed face up to the *direct rays of the sun* it will print much quicker than when the rays strike it obliquely, as, for instance,

FIG. 33.



when the printing-frame is laid down flat on the printing-shelf. Consequently I recommend, for very intense negatives, to place the negative-board face up to the direct rays of the sun, as shown in Fig. 33.

One of the easiest ways to tell when the board is face to the sunlight is to drive a tack perpendicularly in the printing-frame, and in placing the board out to print place it so that the tack will not cast any shadow except where the sun shines direct upon it, and then a place as large as the head of the tack alone will be shaded on the board.

The way I generally do is to place the board so that the shadow which is cast by the board will run in the same direction as the sides of the board, *i. e.*, a straight line continuing from the sides of the board will run in *exactly* the same direction as the shadow cast. An easier way, perhaps, to do this is to place your finger close to the board, so that the shadow will come on your finger at exactly the place where it commences to extend out beyond the sides of the board. Do this on all the sides, being careful that in getting the shadow right on one side that you do not lose it on the opposite one.

When you have obtained the correct shadow, you can with certainty say that for the time being at least, the negative-board is correctly placed face to the rays of the sun. I very often watch in placing a board out in the sunlight, and move it until I commence to

see the light flickering along all of the sides, then I know that the board is all right without the use of my finger. You will soon get used to it, and after the first few times it will not be necessary to place your finger there, and it will only take two or three seconds to place it exactly right with one hand, while with your other you can be taking up another board to place out to print.

The advantage of the above plan can readily be seen by those who print those styles of prints known as "Mezzotints."

One disadvantage in placing the intense negatives face to the sun, without either ground-glass or tissue-paper over them, is the liability of there being some bubbles, scratches, &c., in the glass, which would print on the paper, and these would be the cause of great trouble in touching them out in the mounted print. Many times have I been annoyed in the same manner in printing such negatives, and then would be obliged to place a ground-glass over the negatives, if the defects were very small, and a couple if they were quite large, to avoid their being printed. Sometimes even a tissue-paper must be used to fully answer the purpose; hence the consequence of using the best No. 1 glass in making the negatives.

Print until the shadows are a trifle darker than you wish them to be when done, and then take the print off and examine it. "Print for the shadows and let the lights take care of themselves," is a very good motto, and worthy of notice in printing intense negatives.

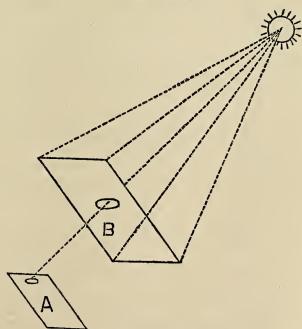
On examining the print, if the lights of the face are very white, so as not to contain much detail, then they should be softened.

There are various ways of doing this, and one of the best in many respects is that of making an aperture full as large as the place to be shaded, in a suitable size piece of yellow envelope-paper, and holding the print in the left hand, and the envelope-paper in the right, hold them both out in *diffused* light, and tone down the blanky whites of the print.

FIG. 34. A is the print to be shaded, and B is the paper with a piece of it cut out, thus enabling us to shade the print easily. The place to be shaded is at the forehead.

Care should be exercised in performing this, as the least thing out of the way will spoil the

FIG. 34.



prints. The paper should always be in motion while out in the sunlight, so that there will not be any sharp line on the print.

The place to be softened should be darkened *a very little*, two or three seconds' exposure to the sunlight, and half a dozen or so more in the diffused rays, being all that is generally required.

Never attempt to shade a print in this manner unless the hole in the paper is full as large as the place to be shaded, for with a smaller hole you will most probably spoil it, by shading it irregularly.

The shaded place should also be a *trifle* darker than what it should be when done. Practice will soon render you perfect in this little printing dodge, as well as in other, at first difficult, parts of printing.

I have seen many prints very much improved by this method, and then again I have seen many others ruined.

A print printed in the manner described above from a very intense negative, will have the following advantages :

1. It will be a bold and vigorous-looking print.
2. It will present fine contrasts without harshness, and will contain softness throughout.
3. There will be detail, both in the shadows and in the lights.

As a whole the prints will be very much improved over what would have been obtained from the negative, providing it had been printed without regard to its improvement.

There are other ways, however, to improve such a negative, and which are more or less dependent upon each other to produce the proper result.

In place of shading the print after it is taken off the printing-frame, it can, if you choose, be done while printing, by shading the shadows of the negative with a cloth, while the lights are printing. In the sunlight the cloth should always be in motion ; in the shade, however, if the cloth is moved a trifle every minute or two, that will be sufficient. It is sometimes better to do the shading in this manner than in any other, when a bolder print is required than what would be obtained by shading it after it is taken from the frame. Sometimes when the shadows are very heavy, and get printed long before the lights get done, it will not then always answer our purpose to take the print off and shade it in the manner first described under the heading of this chapter ; because it will often give a *flat* appearance, shade it as little as we choose, and instead of improving it, the contrary effect will be the result.

This shows then that the *lights need to be printed for awhile after the shadows are done, before we think of shading or tinting them by exposure to the light, and to tell when we have obtained a negative that needs this is our next object.*

I will suppose we have a very intense negative, in which an attempt at shadow effects has been made, and violent contrasts have been produced. The subject is a lady who has gone too far away for another sitting, and the photographs are to be sent to her by mail, and as this is the only negative of her, it must be printed after it is retouched, which latter process makes it still more intense.

The printer here then has a difficult task to make a dozen prints from that negative, and upon making a proof of it, finds as he expected that the shadows are done a long time before the high-lights or lighter side of the face, and having removed the proof from the printing-frame when the shadow side of the face is done, he can then expose the *lighted* side for two or three seconds in the strong sunlight, as has been described above. After he has exposed this lighted side, he takes it in, and immediately notices that the side is no longer white, *but is decidedly flat, being all over alike from the top of the forehead down to the chin. There is then some detail wanted to be printed in on that side of the face so as to prevent flatness, before we shade or tint the side by exposure to the sunlight.*

How can it be obtained ?

There are several ways to do this, which we will here describe, showing the advantages and disadvantages of each.

We might shade the shadow side of the face, by moving a cloth over the dark side of it while printing in the direct rays of the sun, or by moving it once or twice every minute or two, if printed in diffused light.

Before proceeding further, I will here mention that we are supposed to be using the *pink paper*, silvered only a few seconds on a weak bath, fumed a few minutes, and then thoroughly dried.

In reference to the method last described, the results are often unsatisfactory, while the disadvantages are many, viz. :

1. It is a tedious operation, when the lighted side has to be printed considerably.

2. There is great danger of shading the background, drapery, &c., which will (especially when it takes so long a time to accomplish it) show badly on account of the different depths of printing there is to them.

3. Every print you make will have to be printed with all of this trouble, and by the waste of much valuable time.

Our next object then is to obtain a better way to do this, which will have the advantage of being more easily and better done. There is a comparatively simple method, and we will try it.

Instead of shading the shadow side when done, we will simply

apply some transparent color to the back of the negative, *exactly* behind the shadows, so that while the lights are printing, the said shadows will print slower.

This color is applied as described on another page.

By regulating the thickness of the color on the back of the negative, we can make the shadows print about as we wish.

Apply until you get it at the proper thickness or density, which is readily determined by printing a proof of it, with a single tissue-paper placed over the printing-board. The tissue-paper will to be sure make the negative print slower, but it will print better, for this color will more than counterbalance that which we may lose by the use of the tissue-paper.

When this color is applied as it should be, you will then see that by the time the shadows are done, the lights will have enough detail in many places to warrant you to remove the print from the frame, and tint the lighted side, as has been described.

Upon looking now at the print, you will readily perceive at a glance, that the side of the face of the lady's photograph is no longer *flat*, but there is a *boldness* yet *softness* to the whole.

The detail which was printed in on the lighted side of the face, was a *little over the temple*, and considerable more on the *upper, middle, and lower parts of the cheeks*. This is what gives form to that side of the face, and is just what was needed.

Properly silvered pink paper, and a little judicious shading after printing, gave us a *nice bold yet soft print full of detail*, which we secured even in the *deep shades*, from a *harsh negative*, by proper masking or painting of the shadows.

Another way to print this negative would be to place it up against the window-glass, varnished side next to it, and lay a piece of tissue-paper on the back part of it, and with a lead-pencil mark on the paper just on the edges of the deep shadows which you wish to print slower. Now cut this paper out, and place it on the back of the negative exactly behind where the deep shadows are, and then place the negative out to print, after having placed another tissue-paper over the whole.

In placing this paper on the back of the negative, *raise the edges of it a trifle so that it will not lay flat on the glass*, and cause the edges of it to print.

Negatives which have either some transparent color or tissue-paper placed on the back of them should always be placed face up to the strongest light, so that the places which are intended to be shaded will be so, for very often if you lay the board down flat, the strongest light striking the negative obliquely, the thickness of the glass will

cause the color or paper to shade a different place than that which you intend it to do. (Study Figures 33 and 34.) This is especially the case when the place to be shaded is a small one.

The hands and arms, shadows under the eyebrows, shadows in the cheeks, shadows under the nose, the chin, the shaded ear, neck, &c., can very often be improved by either of the last two mentioned ways, viz., transparent color or tissue-paper, sometimes one, and often the other, answering the better of the two. Do not carry either to excess, however, for the shadows need only to be softened more or less according to circumstances, and not entirely removed.

The transparent color is really a good thing, as the following instance, out of a very great many that have come under my observation, will testify :

Miss Hattie W.'s negative is a "*shadow*" one, and she wants it printed in a vignette, but the lighted side does not, when the shadows are printed, possess sufficient detail unless we make use of this color. As the prints from this negative are like the ones described last, we will have to blue-paint three-quarters of the whole face, which can very easily be done, and thus allow good prints to be obtained from it, which, if we did not blue-paint or fix it in some way, we would have a very black shadow, which would greatly mar the beauty of the picture.

Sometimes two or three pieces of tissue-paper, cut to the size of the dark side of the face, and pasted (by touching the centre of each piece with a little starch), on the back of the negative, will answer very well.

An excellent way to print the negative, when it is to be printed either plain or in the medallion style, is to take a magnifying-glass—the so-called "sun-glass"—which has a diameter of about three inches, and by means of it to print up the intense parts of the negative, being careful, however, that you do not draw the light to a focus on the negative, for then you will both spoil the negative and print.

We very frequently use the glass for such negatives, and also for printing detail in white dresses, &c.

For intense negatives, then, we can sum up the following remarks for their improvement in printing :

1st. Pink paper should be silvered on a moderately weak bath, for a comparatively short time to what it is when prepared for weak negatives.

2d. The paper should be fumed only a very few minutes.

3d. The negative should be printed as quickly as possible, which

can be done by placing it in the strongest sunlight, with nothing over it, providing the quality of the glass, &c., permits.

4th. Soften the too deep shadows of the negative with some transparent color, and thus permit the lights to print longer. Print such negatives under tissue-paper.

5th. Print until there is some detail in the lights, taking care that the shadows do not overprint.

6th. After removing the print from the board, soften the blanky whites of the face, light dresses, &c., by exposure to the light, protecting the rest of the print by some opaque paper, as has minutely been described above.

7th. Sometimes the whole print can be held out a few seconds with fine results.

8th. If the places to be tinted by exposure to the light are large, such as a side of the face, there will have to be some detail printed in on that side or place, as the case may be, before the print is removed from the printing-frame, so as to prevent flatness.

9th. By the use of a common magnifying or sun-glass, the lights of the face, hands, &c., can be printed quickly and well.

10th. Study how to improve the prints in printing the order from a negative, and you will not fail to do something towards raising the standard of your work.

The further operations of improving the prints from intense negatives, such as the toning, fixing, &c., will be described under their respective heads.

CHAPTER XVIII.

PRINTING WEAK NEGATIVES.

As is the case in "printing intense negatives," so paper should also be prepared especially for "printing weak negatives."

White paper should be silvered for a specified time on a strong silver printing-bath (say from forty to one hundred and eighty seconds, on a bath from 45 to 80 grains strong of nitrate of silver to the ounce of water); but the strength of the bath and time of floating should vary, according to the temperature of the weather, class of negatives to be printed, &c.

When the paper is ready for fuming, it should be fumed not less than fifteen minutes, and often for half an hour. (See page 31, "Fuming the Paper.") Sensitive albumen paper, when it has been

sensitized the day before, is excellent for printing very weak negatives, giving much bolder prints than it would if it were freshly sensitized.

The paper for weak negatives, like that for intense negatives, should be kept by itself, and for this purpose have a box or drawer labelled "Paper for Weak Negatives."

There are only a few negatives out of a day's printing that need any preparatory treatment before printing.

In by far the majority of cases, the beauty of the negatives consists in their thinness, unless they are so thin as to give very flat prints.

In a thin or weak negative, such a one as I at present have in my mind's eye, its beauty consists in *detail throughout* in the *strongest high-lights*, as well as in the *shadows*; also in its *color, lighting, &c.* In exposing there has been plenty of time given to the negative, and consequently detail is found in all of the shadows and draperies, with the exception of three or four places in the *deepest shadows*, where there is *no detail*, and which accounts for the *brilliancy* of the negatives. A cool gray color to the deposit adds greatly to the beauty of the negative, as well as to its printing qualities.

A nicely lighted negative, besides being beautiful—as we judge it by looking through—also prints better, because then there is left, by the artistic taste of the operator, a few judicious shadows, as last described, such as places in the hair, which by contrast are generally *close to that part which has been powdered, and is photographically full of detail*; and when we admire beautiful negatives, one of the first parts we look at is the hair, especially if it is a lady's, and we very often involuntarily exclaim, "How brilliant and full of detail the hair is!"

Now prints from these negatives, which are so brilliant, bold, and full of detail to the eye, very often astonish us, on account of their being *exactly opposite* to what we had been led to expect, when we looked through them, and at first the photographic printer is bothered a little to account for it.

This is accounted for as follows: They printed too fast, and the negatives may not perhaps have the photographic color which produces the best print.

To print slower, and to give the photographic color they require, coating the back of the negative with yellow varnish has been advised, and I have tried it with considerable success; but the prints have a look of *forced boldness* and *coarseness*, which spoils them in the eyes of most printers. Undoubtedly the *yellow* color of

the varnish is not what we wish. Nothing is better to give a good printing quality to the negatives than *white* tissue-paper.

The way to overcome this rapid printing, is to print either in deep shade, or under several tissue-papers (we have used as many as eight or ten),—the latter when you wish to place the board in the sunlight; and, besides printing slower, they will also print better.

When a negative is very thin, we generally print it under a porcelain-glass, in the sunlight, and the prints are thus very much improved. Try it.

Printing under several pieces of the greenest of window-glass is a very good thing, as a trial of it will show.

Coating the back of too weak negatives with some old sensitive negative collodion will also improve the quality of the prints.

A way which I very often try, if the negative is not too thin, is to coat the back of it with Hance's liquid "Ground-glass substitute," and which I can vouch for as a good thing. The ground side of a ground-glass laid close to the negative is also excellent.

But a negative which has *flatness throughout*, without any boldness worth mentioning, cannot be *doctored* by any such simple treatment as the above. More decided measures will have to be resorted to.

One of the best processes to improve this negative, is by means of that one known by the name of the "Irish Process," called after the name of the gentleman who discovered it. I have seen samples which have been very much improved by the use of this process; and, when it is nicely done, the results are excellent, having considerable boldness in them.

It is a secret process, and so I am unable to give it here. Those who wish to improve the weak, flat negatives, which occasionally fall into their hands, will find the other methods given sufficient.

Another way to improve flat negatives is by the use of the blue-paint dodge, which has been so repeatedly described in this book. I have very often laid it all over the face of the negative, but on the *unvarnished* side of it, and after removing what may be over the eyes, then have printed it, after having covered the back of the negative, or, better still, the printing-frame, with tissue-paper.

Then, a very good way to allow the shadows to print up under tissue-paper, while the face is protected, so as to make them print bold (which they will do if printed under a piece or two of tissue-paper), is to cover the whole negative-board with tissue-paper and then lay a dark cloth on that part which you wish to be shaded,

moving it every few minutes while there. By a little ingenuity, in the way of arranging tissue-papers, they can be made to answer a variety of purposes.

CHAPTER XIX.

A FEW MORE REMARKS ABOUT PRINTING— TREATMENT OF BROKEN NEGATIVES.

IN the first chapter of this book, The Positive Bath for Albumen Paper, I have given a variety of formulæ for both preparing and taking care of the printing-baths, which I have either by my own, or by the experience of some photographic friend, proved to be very fine in their results, if carried out as recommended.

When a paper—say, for instance, the Hovey—is floated upon the silver bath, a treatment is required which at first seems peculiar. If you float this paper upon a medium-strong silver bath (40 to 45 grains strong, in summer) it will have to be floated a long time to obtain good results, and if floated upon a weak silver bath (25 to 30 grains strong, also in summer) it will have to be floated a short time.

The reason of this is obvious. A strong silver bath repels the paper at first, for quite a number of seconds, and if removed from the bath before the paper has taken to it, it will dry in tear-drops, and when printed it will be marbled in its looks, which is in itself a sure sign of too short silvering. If the paper, when removed from the bath, curls considerably, then that is another sign of too short silvering, and consequently paper silvered on a strong silver bath should be silvered for a longer time than what you would silver the same on a weak bath, and then the paper will have a strong solution on it, and will be very brilliant, both when just removed from the printing-frame and when dried and finished; but it will be very much bronzed in the shadows. For *weak* or *flat* negatives, that paper would be just the thing; while for *medium*, *i. e.*, neither intense nor weak negatives, it would not, and for the *intense* negative it would be sadly out of place.

For medium negatives, the bath for sensitizing the paper (Hovey) should be from 28 to 33 grains strong, of silver alone, to the ounce of water during the summer; and while you float in the former case, on a bath of 45 grains, from 35 to 50 seconds, you should not in this

case float more than from 20 to 25 seconds. If you float the Hovey paper on a 30 to 33-grain bath longer than 25 seconds the paper will print "*woolly*," even if silvered only 5 seconds more than the allotted time.

The paper is easily told, as to whether it will print woolly or not, by examining the surface of the freshly silvered sheet as soon as it is removed from the bath; if it looks dead and sunk-in you may be assured that it will look *exactly* so when it is printed.

The experienced printer, when he removes the first sheet of paper from the bath, can tell whether he is silvering the right time or not (at least, very nearly), and then he can act accordingly, with astonishing accuracy.

There are often very bad results occasioned by having the silver solution too cold. This is especially the case in the winter. Look out for it, if you wish to avoid trouble, both in the sensitizing and working of the paper.

During the hot months of summer the paper should be kept in a damp box, for a day or so before it is silvered, for when the albumen on the paper is in a damp state it will more readily take to the bath than when it is dry and horny. During the winter the paper should not be kept in a hot room for the same reason.

TREATMENT OF BROKEN NEGATIVES.

In many cases, a negative that has been broken can be mended, so as to be strong enough to resist all ordinary pressure of the back-board while printing, providing another glass is first laid in the frame and the negative laid on it.

Lay a piece of cotton flannel on a level bench or table, where there is plenty of light, and match the broken pieces of the negative on it, face up. Examine the pieces closely with a magnifying glass, and lay them in *exactly* the position they were in before the negative was broken.

Now cut strips of plain, unsalted paper, about an inch wide—no more though—and apply melted glue to one side of them; now place the same side of the paper to the borders of the negative, permitting about half an inch of the width to project out beyond the glass.

Do this to all of the sides and then turn them over the edge, *i. e.*, the thickness of the glass, on to the varnished side of the negative, and rub the paper with a tuft of cotton in close contact with the glass. The negative, as it is now, has a half-inch strip of paper glued to the four sides of the *varnished side* of it, and also a half-inch strip projecting out beyond the edges of the negative, which has

glue on it, but is not as yet stuck to the *other* side (Fig. 35). When the paper is dry, turn this negative over and apply moisture to the glue on the paper, and draw it *tightly yet tenderly* over the edges of the glass, and press it down smoothly on the back of the negative. Do this in turn to all of the sides, and then, when the paper is dry, you will find the pieces quite strongly held together, and you can move it about, in and out of the frame, without any danger of the pieces separating.

But, however, if these strips of paper do not hold the negative sufficiently together, as in some cases they will not, then lay the negative

FIG. 35.

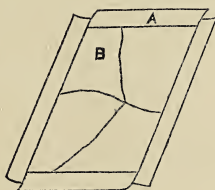
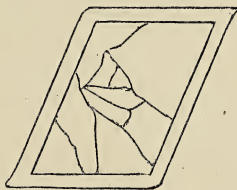


FIG. 36.



face up on a piece of plain unsalted paper, match it, and with a knife or shears cut the paper around the negative, leaving sufficient of it on all sides to allow it to turn over, not too far, on the varnished side, which, you remember, is uppermost (Fig. 36).

Mark with a lead-pencil on the paper, on all sides of the negative, *close* to the edge of the paper. Now remove the negative and apply glue to the side of the paper which has been marked.

Apply evenly, and lay the pieces of the negative quickly on in their proper position, before the glue has commenced to dry. Bear in mind that the *glass or back part of the negative* is laid down on the glued paper, and see also that the negative when placed together lies on the paper as it did before you removed it to glue the paper, which position is easily told by the *marked lines* on the paper.

When the pieces are matched exactly, by the aid of a magnifying glass, then gently draw the paper up which projects out beyond the sides of the negative and stick them to the varnished side of the glass. This paper should not cover so much of the varnished side as to cover any part of the negative that is to come in the print when trimmed.

The negative should then be turned over, which can very well be done, if you were, in the first place, to place under both paper and negative a whole glass of the same size, or a little larger if desired,

as the mended negative would measure. By taking hold of this under glass and placing a couple of fingers on the broken negative, to prevent it from slipping, you can easily turn it over, and then lay it on a level stand covered with soft flannel.

Now rub with a tuft of cotton the paper which is stuck on the back of the negative, commencing at the middle and rubbing outwards, so as to secure both perfect contact and for the purpose of removing air-bubbles between the two surfaces.

Let dry, and you will have a negative that can be printed, if you wish, without another glass being placed first in the frame, and which can now be packed away as if unbroken.

This negative having a thick white paper on the back of it, will necessarily print slowly, but if printed face up to the strongest sunlight but little difference in the time of printing will be noticed.

Medallions or plain prints can best be made from such a negative, though it may be vignettied by placing a Waymouth vignette-paper on the back of it.

The contraction while drying of the expanded paper will draw the pieces of the negative more firmly together, and thus secure greater exactness.

CHAPTER XX.

CUTTING THE PRINTS.

THERE is no part of photographic printing that is more difficult, or shows more the taste, skill, and worth of a photographic printer than this simple (?) process (*as it is called by some*) of "cutting the prints." Many have been the prints that have been ruined in the trimming that were otherwise good. What would be the value of a print that was brilliant and most beautifully toned if it had been ruined in cutting?

I have often been surprised that prints, which are so beautiful in other respects, should be so *abominably cut out* as some have been that I have seen, when, at a glance at the prints, we could see that, with this exception, the printer thoroughly understood his business, for even upon the closest examination of it, before it was even burnished, we could not see either weakness or coarseness of the paper in the slightest degree, too much bronzing in the shadows, lack of brilliancy, printed neither too dark nor too light, toned so finely that we

cannot criticize it a particle, and, in fact, the whole print was a perfect gem, *with this exception*.

We will pause here a moment and consider.

Undoubtedly all of those parts of this print which show *workmanship* were done by a *workman*, an excellent one too at that, whereas the trimming, which certainly does not show workmanship, was most probably not done by a *workman*, but by one who was not well learned; most probably by a boy, or a very careless assistant printer.

It has very often been said, and I myself have heard the expression several times, that "any one can trim prints who has been in a printing-room two days;" and I must here beg leave to differ, for, on the contrary, it takes YEARS instead of *days* to trim them as they should be; and it is owing to the belief of many photographers in the quotation I have above cited, that the almost inexperienced help is told to trim the prints (so as to keep them busy, you know!) while the foreman printer and his experienced assistants are printing, &c., with only this advice (and often not that), "to be sure and have the *nose* or *mouth* come in the centre of the print." This part of the work should be intrusted only to an experienced person with a correct eye and good judgment as to the effect required in the finished picture.

In the cutting of the prints there are a variety of rules to be observed which tend towards the prints being properly cut, and, although it is in some cases almost *utterly impossible* to give rules that will reach them, not knowing the style, &c., of the prints, as almost every operator poses differently, yet a very great number of cases can be hit by the rules which will be given below.

The implements, &c., that are used in cutting the prints are:

One large plate glass, 10 x 12 inches in size, for cutting the print upon, and in case you cannot obtain a plate glass, a thick, level, ordinary glass of the same size will answer.

One whetstone.

One Robinson's Photograph Trimmer.

One pair of large shears.

One shoemaker's knife.

One glass, size $7\frac{3}{4} \times 9\frac{3}{4}$ inches, for cutting 8 x 10 prints.

Two 4-4 glasses, one $6\frac{1}{2} \times 8\frac{1}{2}$ inches, for ordinary 4-4 mounts, and one 6 x 8 inches, for prints that are to be mounted on lithographic mounts.

One oval 4-4 brass mat guide, size of opening $5\frac{3}{4} \times 7\frac{3}{4}$ inches.

Two Imperial size glasses, one $4 \times 5\frac{3}{4}$ inches, which is the size generally used, and one $4\frac{1}{2} \times 6$ inches, which is used when an Imperial glass is wanted a little larger for special cases.

One Victoria glass, size $2\frac{3}{4} \times 4\frac{1}{2}$ inches.

Two *cartes de visite* glasses, one $2\frac{1}{4} \times 3\frac{5}{8}$ inches, which is the ordinary size, and one $2\frac{3}{4} \times 3\frac{3}{4}$ inches, which is made larger for the same reason as the Imperial. When the latter glass is used the prints should have been printed upon large card pieces, as the pieces that are obtained, as has been shown on a previous page, are a trifle small for the last-named glass. If printers wish to obtain a great number of small card pieces from a sheet of paper, they will then have to have their card-glasses shorter.

Have places for these things, and always keep them in their places, except, of course, when in use. Prints larger than 8×10 inches are very seldom cut, either before finishing or after, for they are mounted upon plain "No. 1 Extra" cardboard, size of said cardboard varying according to the intended size of the prints, and covered with either oval, square, or arch-top mats, and framed with the mats placed next to them.

Although these large prints are not cut to any particular size before toning, they are trimmed and their edges cut cleanly, so that they will not be so likely to tear, in the water, during the future operations which they are destined to go through.

In many galleries the 4-4 prints are not cut to any particular size, but trimmed as the larger prints are, and mats are also placed over them when they are about to be framed.

Considerable saving can be made, as regards the expense of a mat every time a print is framed, if the prints are cut to the exact size and style before toning, as is the case in regard to the common *carte*. For instance: If you were to cut your 4-4 prints either oval or square before toning, the prints could then be mounted upon your 4-4 cardboard, which was prepared for it, and, as will be shown below, you can save considerable money in the course of a year or two by so doing, of course in a greater or less degree according to the amount of business the photographer has.

To do this, however, it is necessary to have mounts prepared especially for the purpose, for if the prints were mounted upon the plain cardboard, and no mat placed over them when framed, the effect would not be at all pleasing. *

In many galleries the prints are cut as described above, and mounted upon cardboard ornamented with gilt stripes, in the oval and square forms, inside of which forms the prints are carefully mounted.

Below the mounted photograph the photographer has his name printed in small gilt letters. A print cut oval and mounted upon one of the oval mounts has the appearance of having an oval mat

over it, with the advantage of having your name printed on it. A great objection to this is that of having to choose the frame at the time of making your choice of picture, so that the check can be made out properly, thus enabling the operator to mark on the negative either *square* or *oval*, which means to cut the 4-4 print square or oval, according to what is marked on said negative.

For instance, a lady wanted a 4-4 arch-top, and on choosing the frame at the time she decided on the style of print; she chose a square one, and the check being made out properly (having all the particulars on it), and being passed to the operator when she entered his domain, he reserved *his* part of it, and sat her according to orders upon it, and marked the negative as per check: One 4-4 Arch-Top, No. — (of negative). Often the words, cut square, are placed on the negative; but in this case, when the style is an arch-top, it is not necessary, because the print cannot, with taste, be cut any other way.

When the print is to be mounted upon a *lithographic mount*, the operator marks on the negative L. M., and then the printer also marks the same letters on the back of the print before it is toned, being sure in doing so that he marks in the shadow or drapery part of the said print, and the mounter, as she pastes the print, sees the marks, and consequently mounts such prints upon the lithographic mounts.

If the lady had chosen an oval frame, she would have to have a vignette style of print to look well, and the negative should then be marked (also as per check): One 4-4 Vig., No. — (of negative), cut oval. Of course prints that are printed either in medallion, square, or arch should be cut square, except in a few cases when the prints are printed plain; then they can sometimes be cut in the oval form if desired.

To those photographers who are not in the habit of this mode of working the above may appear to be very complicated, but it is so arranged in every well-regulated gallery, and where there is perfect system throughout the establishment. It is one of the most perfect ways, as regards system, connected with the orders, that there is known, and it is very seldom any mistake occurs when once the plan is in good working order.

It might be supposed that this would cause trouble when duplicates are wanted from the negatives, but that is not so, for when duplicates are ordered from frame-photographs (*i. e.*, those photographs which are to be framed), the patrons almost invariably order the same style of frame and print that was before purchased, and the printer is thus greatly benefited, because he knows how to print every duplicate that is ordered from "old negatives," and when

there should happen to be a variation in the style of frame and print, the *thinking* photographer will readily invent some way to prevent mistakes.

The above, however, is calculated to be followed out by those photographers whose customers make their selection as to how they want everything done, but when, as in the gallery of Mr. Sarony, and also of Mr. Howell of New York, the photographic artist chooses the style best suited for them, &c., and the printers print the order as they think best, no such way is required, and a more simple manner will answer.

When the prints are to be cut in an oval form, the excellent tool known as the Robinson Photograph Trimmer is indispensable. (See

FIG. 37.



Fig. 37.) It does its work so quickly and so well, that no one can estimate it too highly. It will outwear a gross of knives, and does its work better, without tearing the prints. Guides that can be used with it are furnished at a trifling cost.

This trimmer, by the way, is also an excellent thing to use in cutting medallions and masks whenever you may wish to make them.

When you are about to cut square 8 x 10 prints the plate-glass is first laid down on a level bench and the print on it, and upon the print is laid the glass that is used in cutting the print. Adjust this latter glass, and with the shoeknife cut a quick and clean cut on all sides of and close to it. If you choose you can cut the other sized prints, such as the Imperial and Victoria, by the aid of the shoeknife and the proper glasses. I have recommended a shoeknife because it is cheap, costing only about twenty cents; then again, it is better handled than a penknife.

When cutting with the glass and knife place two or three fingers of the left hand *firmly* yet *lightly* upon the glass, and cut with the knife in the right hand, cutting around the glass, shifting the elbows a little to one side or the other as occasion requires. (See Fig. 38.)

The Robinson Trimmer will also answer for cutting square prints with a very slight round corner.

There are a great many printers who use the knife altogether in the cutting of the prints, and then again there are many who use the shears.

I generally use the shears for *cartes* and Imperials, but for larger prints I use the knife.

It may appear to be a small matter for me to write here how you should use your glass and shears in cutting, yet there is one thing

FIG. 38.

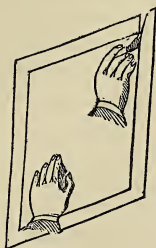
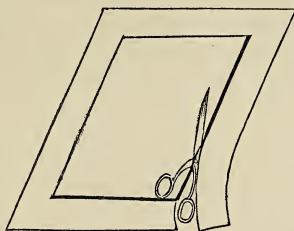


FIG. 39.



which if observed will save your cutting glasses, and also save your shears from getting dull so quickly ; it is this :

Many persons in using the shears cut down at the lower part of the glass at an angle, so that the blades of the shears run along the edges of the bottom part of the glass-guide, and consequently the glass is very soon *nicky*, and in a short time some of the corners are broken off, and the glass is worthless.

Now this is owing to the style of cutting (or *chopping*) with the shears, because every time you cut a print you also cut the glass, or try to.

You should allow the blades of the shears to *fall parallel to that side of the glass at which you may be cutting* (see Fig. 39), and you will save your glasses, and also prevent the shears from getting dull so quickly.

The rules which will perhaps help the beginner in cutting the prints are the following :

1st. Never have the nose or chin higher than the middle of the print, if the head is of an *ordinary* size, and the print is printed plain.

2d. Allow a trifle more space on that side of the print toward which the head is turned, being careful not to allow too much, however, as very often the shoulders suffer by the abuse of this rule.

3d. If the print is to be a *carte de visite*, and the head is very large, it ought to be cut higher up in the print than otherwise, so as to obtain plenty of the body to balance the head.

4th. In cutting out a print, when the figure is leaning on a table, chair, &c., always cut in enough of the accessory to give an air or look of solidity to the base of the print.

5th. Always lay your glass, when you are about to trim the prints,

in the same direction as the body is, providing it is not leaning on a table, for then, of course, you must represent the idea of leaning, but when there is no such idea to be conveyed then trim as before said, so that the body will not appear to be leaning too far forward or backward, and thus give the beholder the idea of falling.

6th. Sometimes by cutting the print so that the person will appear to be leaning *slightly* backward, the effect is very good, providing the figure is that of a large Berlin head. Look out that you do not overdo this, however.

7th. If the print is printed in a medallion or arch-top you should cut it so that there will be as much of the tinted border show on one side as there is on the other, and as much at the top as there is at the bottom, and always cut prints that are printed in either of these styles in the *direction* that the oval or arch-top may be, and never cut them so that the cut and the oval or arch-top will lay in *different directions*. To do this you must be sure, in placing on the oval or arch-top for printing, that you get them to lay in the right direction.

8th. If the figure is a standing one, and the whole of it can be cut in the print, then do so, and not cut in only part of it, as is very often done.

9th. If it is a sitting two-thirds figure, then do not think of such a thing as having the nose or chin come in the centre of the print, as per Rule 1st, but have it come considerably higher up in the print, being careful, however, that you do not get it too high.

10th. Sometimes there are groups of two, three, four, or even five persons in a *carte de visite* photograph, and, in cutting out these kind of prints, be sure that sufficient of the drapery on either side is cut in, as the neglect of that will make these outside persons appear very slender, being no balance to the figures; and, for such cases as these, either in the small card or the Imperial, we have made the larger glasses to cut with as described above.

11th. If the figure is a standing one of a lady (a bride), with a long-trail dress, and leaning on a chair, then in cutting, not only cut the print so that you will give the idea of leaning on the chair, but cut a very great portion of the dress in, even if the figure of the lady herself is over to one side of the print, for the face is turned (or should be) towards that direction, and you can trim as above, without danger of hurting the looks of the print, for, on the contrary, you will greatly improve it.

12th. When the background of the print is one that shows interiors or exteriors, such as the panels of doors, or a set of perpendicular rows of columns, &c., always cut the prints so that these uprights

will be parallel to the sides of the trimmed print, and the cross-panels parallel to the base of it. This kind of a background is more often found in the large prints, more especially so when the "Bendann Backgrounds" are used.

13th. In standing figures, very often the place where the floor meets the background comes in sight when the print is trimmed, and in such cases you should always cut the *flooring parallel to this line*; and, in the great majority of cases, if the position is properly made, the figure will lean in the proper direction by the observation of this simple rule.

14th. Do not, when cutting prints, try to see how quick you can cut them, but how well, for a dozen well-trimmed prints are worth more than a hundred indifferent ones. First try and see how well, and then, *after* you have learned that, then see how quickly you can cut them.

The *advice* and instruction which we have endeavored humbly to give in this chapter, is intended for those persons whose experience at printing has not been so extended as ours, *and it is emphatically for such persons that we have written the above, and not for learned printers.*

CHAPTER XXI.

WASHING THE PRINTS.

NEXT, in order, comes the washing of the prints, although in many galleries the *acidifying* of them is done first.

It is a question whether it is best to place the prints first in the acid water or not, and there are many photographers that believe in washing them first; and then, again, there are many that believe to the contrary. It is not in my mind a matter of so much importance, but for several reasons I am most in favor of washing them first; and so I will commence with the washing, and then, in the next chapter, the acidifying of them will be treated of.

It was supposed by many photographers, two or three years ago, that the washing of the prints was a matter of considerable time, and consequently they would let their prints wash half an hour in running water, moving them occasionally with the hands.

Within the last year or two, however, the photographic printers have found out that such long washing is not only *unnecessary*, but

injurious to the prints ; and at the present day, in many of our first-class galleries, this preliminary washing is done in a few minutes.

The way we should advise our brother printer to wash his prints is as follows :

Take a half-sheet dish, although any other, if large enough, would do as well, and pour into it *lukewarm* water, until the dish is about one-quarter full. Now place the prints in, by letting a few drop out of your left hand at a time into the dish, while, with your right, you gently and quickly push them under the water, until you have placed the whole batch of prints in the bath. Again, do this as quickly as possible.

I have recommended to let a few (three or four) drop from the hand at a time in the water, because beginners are apt to get some of the prints wet (and let them stay in the hand for some time in that condition before they are placed in the water), if they were to take them from the left hand with the right one, and then place them in the water, as they might want. By being very careful, however, they can do it.

The objection to getting the prints partly wet, and then remaining in that state, even for a few seconds (say eight or ten seconds), before they are wholly submerged in the water, is, that where the water has touched them, they will turn red ; and if they are thus partly wet by the water, then, after you have placed them in the dish, they will show spots redder than the other parts of the prints, which will sometimes be very troublesome in the succeeding operations.

After the whole batch of prints that are to be toned are placed in this bath of warm water, move them about briskly for about five minutes, and then gently pour the water off into a barrel, leaving the prints to lay flat on the bottom of the dish. Then rinse them with a little more water, and pour this also into the barrel.

These first two waters we save, and throw down the silver in them, by sprinkling a little common salt in the contents of the barrel, upon the addition of which the silver in the solution will be deposited on the bottom in the form of chloride of silver. Upon adding salt to the solution, it will turn milky ; whereas, before it was added, the solution was of a cold slaty color. When this chloride of silver is thoroughly deposited, then draw off the clear water by either a siphon or a faucet, as may suit the taste of the printer.

Before taking for granted that the silver in the solution is all precipitated, because you have previously sprinkled salt in the barrel, the solution should *again* be tested, by a pinch or two of salt, and if there is no more precipitate, then the silver is all

precipitated, and the liquid can be drawn off without any further delay.

When you have rinsed the prints, wash in one or two other changes of water, which you need not save, and then they are ready to be placed in the acidulated water, which will be treated of in the next chapter.

When the prints are in the first change of water, the washing is done quickly, by permitting them to come to the surface, and then gently pushing them down again to the bottom. The prints are washed more thoroughly and quickly in this way than in any other. The time required to do the above washing, after the whole batch of prints are placed in the bath, is only from five to ten minutes.

CHAPTER XXII.

ACIDIFYING THE PRINTS.

Now, since the prints are sufficiently washed, they are ready to be placed into the acid water ; but, before we do so, we will pause and consider for a few minutes the object of doing this.

It has been supposed by many printers, and in fact that is the general opinion at the present day, that the prints are placed in this bath of slightly acid water for the simple purpose of making them *red*, so that they will be able to watch the toning, and also to tone them better. Now this is partly so, but it is by no means the *principal* object of placing them in the bath, as we will presently endeavor to show.

If our only object in placing the prints in this bath was to make them simply red, why should we not, as was formerly done, place them in a bath of *salt* water, and thus redden them, as it will do the work as quickly, if not quicker, than the acetic acid does, besides being very much cheaper ?

The answer from some of these printers may be that they cannot obtain such nice tones as they could if the prints were "red up" with acetic acid ; and, if that is so, is it not evident that there is something in the action of the acetic acid on the prints that renders them better for the toning operation than the action of the salt on them does ?

The action of the salt water on the prints converts the remaining

silver left in the prints after washing into the *pure chloride of silver*; whereas, before, part of the silver on the surface of the prints was the chloride, albuminate, and the nitrate, for it must be borne in mind "that the salt in the paper, when it is floated upon the positive bath, takes up the silver it needs, and forms chloride of silver," which is more sensitive to the light than the nitrate, "and the albumen of the paper takes up some, and forms the albuminate of silver;" and, besides this, "there is some more absorbed merely mechanically," which is properly the nitrate.

(Our attention was first called to the fact we have just explained upon reading, a couple of years or so ago, the action of the positive bath on the albumen paper, when floated upon it, in Dr. Vogel's *Handbook of Photography*.)

Thus you see that all of the silver that was on the surface in different forms is now reduced to the same form, viz., *pure chloride of silver*.

Now if you were to place the prints in a very diluted bath of acetic acid instead of salt, then the remaining silver in them will be perfectly converted into the *acetate of silver*, if they are permitted to remain in the bath long enough for the acid to overcome the other natures of the silver, and that is why I have below recommended the prints to remain in the acid water ten minutes, for the acid to do its work well, and that is also the reason why (if the prints stick together for any length of time), *even if they have once been wet all over with the acid water*, the prints at those parts where they had laid close together *will not* be properly converted into the acetate of silver, and will not tone well, although they may not have changed color any, *i. e.*, those parts of the prints which may be stuck together will be full as red as the rest of the prints, and thus to a careless eye may be all right, but in the toning of them, the printer will perhaps wonder what makes some of them tone so much better than others, although in the distribution of color on the surface they seem to be all alike.

The acetate of silver is worked upon better by the toning solution than either the chloride of silver or the mixture that composed the silver on the prints before they were placed in the acid or salt water (being chloride, albuminate, and nitrate).

The proof of the above can be observed by the toner as he tones the prints that have been "red up" in either the salt or acid water; and then again as he tones those which have not been "red up" at all, but simply washed.

I do not mean to give the young beginner the impression, however, that prints that have been placed in the salt water, in lieu of

the acid water, will tone *badly* in the toning baths, for, on the contrary, they will tone *very fairly*, as the good old-fashioned tone (good if it is old) will show, but I do mean to say that *better tones* can be obtained with the use of the acid water, *provided the conditions are alike*. An excellent toner may take prints that have been placed in salt water and obtain better results than an indifferent toner would with prints that have been placed in acid water.

The quantity of the acetic acid required is just sufficient to properly convert the remaining silver in the prints into acetate of silver, as has been said before, and no more. I use generally about an ounce of the acid to the gallon of *lukewarm* water. I use lukewarm water because it will more quickly do the work required than cold water.

In Germany and England glacial acetic acid is used, but when that is used only the slightest quantity is required, as it is very much stronger than the acetic acid No. 8. This acid (glacial acetic) is not used at all, I think, in this country, and when the acetic No. 8 can be obtained it had better be used, as the glacial is very expensive, more so than it is proportionally stronger.

When you commence to make your acid bath, place the lukewarm water first in the dish you are going to use, and, after measuring out the quantity of the acid in a small vial, pour it into the water at different places, and then, with your hand, stir the water well for about one minute, so as to get the acid thoroughly mixed with the water. Now place the prints into this bath as quickly as possible, in the manner described in the preceding chapter, *i. e.*, by permitting two or three to fall at a time from the left hand, while with the right they are separated as quickly as possible.

When you have placed every print in the acid water, then keep them in *constant* motion for *ten* minutes, for the reason above mentioned (*viz.*, that the silver in the paper will be equally converted into the acetate of silver), and then pour off the acid water and *save it* (for this acid water has released still more silver from the prints), and then wash the prints in three or four more changes of water, so as to remove the bad smell of acetic acid from them. It is very necessary that the prints be washed well after acidifying, because, if the superfluous acid water is not well washed from them, *false, deceiving tones* will be obtained in the toning bath, which will in a great measure be destroyed in the further operations with the prints. The tone will be a superficial and uneven one. The prints are finally sufficiently washed for the toning operations when, upon smelling them, there is only a very slight vapor of the acetic acid given forth.

CHAPTER XXIII.

TONING BATHS.

OF all parts of photographic printing this is undoubtedly the most important and difficult, with the exception, perhaps, of the printing bath.

There are a great variety of toning baths in use, a great proportion of which are excellent for certain cases. We shall here give our own humble thoughts or ideas, in the making and care of the different toning baths, with such quotations as may be found necessary, from others probably far more skilled in this branch than the author may be.

Before proceeding further, I will explain to the beginner the reason why there is such a bath, called "the toning bath," used.

The prints, as they were left in the last chapter, need some agent to remove the silver left in them, else they would continue to darken upon exposure to the light, and in a short time be so dark as to be indistinguishable. This agent is known by the name of hyposulphite of sodium. If we were to place the prints as they are now directly into the soda solution, they would turn a dirty yellow color, to get rid of which and give a more pleasing one a bath called, as before said, "the toning bath," is made.

Hence, then, the object of the toning bath is to give partly *permanence*, but principally to give the *color* or *tone* to the prints, and in this color we may expect to find brilliancy and beauty, according as to how the prints were treated while in the bath, as will be shown in the next chapter.

In the first place, good chloride of gold is necessary in the making of these toning baths, and to those persons who do not wish to make their chloride of gold for themselves, among whom the young beginner should certainly be classed, I would advise them to purchase a stock from some reliable stockdealer. Each bottle contains fifteen grains, which may be dissolved in a bottle containing fifteen ounces of pure filtered rain or distilled water.

Label this bottle, "Stock Gold Solution, 1 grain to the ounce of Water." This solution will be slightly acid, which it should be to prevent the light from precipitating the gold. Keep this bottle in the dark, or at least out of the brightest diffused light.

ACETATE OF SODA BATH,

As made and recommended by Mr. George Hooper, in the *British Journal Photographic Almanac* for 1873, I will here give, judging it to be excellent. He gives preference to the bath made as described below, for the following reasons, viz. :

"1. For the beauty and permanency of its tones.

"2. For simplicity of formula.

"3. For its great economy.

"4. For its certainty and regularity."

The bath is made as follows :

"Always keep in stock the following solutions :

"Solution No. 1.—Dissolve a quarter of a drachm of chloride of gold in fifteen ounces of water.

"Solution No. 2.—Dissolve a quarter of a pound of acetate of soda in forty-eight ounces of water.

"To make the bath, take of

Water, ... 30 ounces.

"Then add

Solution No. 1, ... 3 ounces.

"And next add

Solution No. 2, ... 3 ounces.

"Let stand a whole week before using ; if wanted sooner, make it with hot water. This bath will tone day after day until at least four sheets have been toned, and when apparently exhausted, throw away say six or ten ounces of it, and add a similar quantity of fresh bath, made according to the same formula, taking care its age is not less than one week, as the acetate bath goes on improving, and if used too new would tone unevenly, and the prints would lack that brilliancy so easily obtained when the bath is of the proper age.

"Always take the prints out when of a *purplish*-brown, but never at the *rusty* brown stage.

"If the washing has been carefully done, you will find that nearly all of the batch will be finished about the same time, vignettéd portraits first, and then the plain portraits, which latter always take up a larger proportion of gold.

"When the toning is finished, pour your bath back into the jug or bottle and keep the same for next time. Should there be a slight deposit of chloride at the bottom, decant carefully so as not to disturb it ; this will save all filterings, which are always better avoided."

SAL SODA TONING BATH.

Distilled or Melted Ice-water, ...	64 ounces.
Acid Sol. Chloride of Gold (4 grs. to the ounce), ...	1 ounce.
Sat. Sol. Sal Soda, ...	$\frac{1}{2}$ ounce.

The bath feels quite slippery to the fingers. Make it a full half hour before you wish to use it, and during the cold weather make it with the water slightly warm. Make it every night and save the old solution, and throw down the gold with protosulphite of iron.

This bath bleaches a little more than baths generally do, and so the prints should be printed quite dark. The prints when first placed in this bath will turn quite red after a minute or two, and after they have discontinued turning red watch them closely, for they will now very soon commence to tone so that you will readily notice it, and when they have once commenced to border on the tone you desire they will very quickly arrive at the proper stage.

In toning disregard the shadows, but watch the high-lights and half-tones of the face, and when they just commence to look purplish, and the red look has disappeared, they are toned, and should be immediately removed to a dish of running water. The hair, draperies, &c., may not look to be toned, but they are.

When you are fixing these prints they will turn a variety of colors before they turn the right one, and when they turn that color, to which you toned them, you may be sure they are fixed. See the chapter on Fixing the Prints.

CHLORIDE OF LIME BATH.

With this bath pure whites and fine blacks can be obtained ; such effects as are suitable for architectural drawings, pencil sketches, &c. It should be made forty-eight hours before use, and when about to use it add a little of the gold solution, also a little of the chloride of lime.

There is considerable fault found with this, both on account of the uncertainty of its composition and also with the various results obtained with it.

That is owing to the photographer's using what is called the *saturated solution* of the chloride of lime, when in many cases the solution is far short of being saturated. When you commence to make a saturated solution of this chloride of lime, and have placed nearly two ounces of the chloride in about twenty-five ounces of water, there will be a precipitate in the bottle which will make you think

that the solution is saturated, since it will not dissolve upon repeated shaking of the contents, but this is simply a part of its compound (the hydrate of lime), and you can still add more of the chloride of lime to the solution before it is saturated, as this chloride is separated and dissolved, whereas another part of its composition is not, for the beginner must bear in mind that the so-called chloride of lime is a *compound*.

The apprentice thus sees why he is often in difficulty in using this bath, and to obviate it we recommend that instead of using a saturated solution, to accustom himself to weigh the chloride of lime, and then he can, after he has once started rightly, keep it always the same. This bath can be used a number of times, by decanting the clear liquid out of the bottle and adding a little gold, enough to tone the prints, and a trifle of lime. It is made as follows :

Water,		40 ounces.
Chloride of Lime,		5 grains.
Chloride of Gold,		4 “

The chloride of gold may be made in strength at about one grain to the ounce of water, and may be neutralized with carbonate of lime, if it is acid.

If the chloride of lime bath is made as above, we do not think that there will be any difficulty in working it.

CITRIC ACID TONING BATH.

This is a most excellent bath, either for portraits or landscapes, there being in its composition no strong alkalies or acids that will be apt to hurt the albumen on the prints a particle. We used this bath two years, and it is a most worthy one. Here it is :

Solution No. 1.

Citric Acid,		1 ounce.
Water,		20 ounces.

Solution No. 2.

Chloride of Gold,		15 grains.
Water,		15 ounces.

Stock Solution.

Now take of Solution No. 1, $2\frac{1}{2}$ ounces ; make slightly alkaline with saturated solution of bicarbonate of soda $2\frac{1}{2}$ ounces, or about that. Solution No. 2, $\frac{1}{2}$ ounce ; water, 64 ounces.

When ready to tone take sufficient of the “stock solution” (which should never be less than three or four days old) and add thereto

one ounce of gold solution No. 2, and make this fresh solution which you are about to add to the bath a little alkaline with bicarbonate of soda.

A better way, however, for the beginner to add this fresh gold to the bath, instead of pouring the gold immediately into the bath, is to pour it first into a clean graduate and *there* make it alkaline. Pour some of the toning solution (stock) into the graduate and thoroughly stir with a glass rod, and then add the whole to the rest of the bath which is in the dish and stir well again. To every four sheets of paper you tone, add about an ounce of gold solution; adding, however, at different stages of the toning operations and not all at one time, as that would make the first few batches of prints tone too rapidly. Do not add any gold while there are any prints in the bath, and stir well, and allow the bath to stand without being used for about three or four minutes after you add the gold. I recommend the above cure to beginners, because they often obtain uneven tones by the abuse of the advice given above.

Do not tone in a too strong light, but in rather a weak one, and judge not the tones of the prints while in the hand, but while lying down in the dish.

Tone *exactly* as you wish them when dried, and no more nor less. Wash the prints constantly in running water after toning. Fix as usual.

BICARBONATE OF SODA BATH.

This is probably one of the best of baths, and I have seen some of the very best of tones obtained with it.

It is argued by some that the simpler a bath is the better, and that it is only chloride of gold in the toning bath that tones, and that all other ingredients that are placed in the bath are useless, and this bath is just what these photographers advise, since there is nothing else to be placed in it. Here it is:

Chloride of Gold Solution (one grain to the ounce of water),	1 ounce.
Water, ...	16 ounces.
Bicarbonate of Soda (saturated solution), ...	10 minims.

Make half an hour before use, so as to allow it to ripen thoroughly. Make of lukewarm water. This bath cannot be kept, and needs to be made up fresh every time you prepare to tone. Throw down the gold in the old bath with protosulphate of iron.

It is ready for toning when it has commenced to *discolor slightly*.

I have one more bath to give, and then I am done, and I have reserved this one for the last, not because I think it the least im-

portant, but because I think it the best of the whole lot, for I do not think that there is a bath besides this one that works so prettily during toning, and which gives such magnificent tones.

It has the following merits :

1st. It is simple in construction, and not apt to be changeable.

2d. The most beautiful tones can be obtained with it.

3d. The alkali used in it is not used in such abundance as to hurt the albumen a particle.

4th. It will tone a weak and flat print the best of any bath that I have ever used.

The most beautiful tones are attainable with it, the high-lights and half-tints of the face being very clear, and cool in the more retiring shades, while in the hair, deep shadows, and draperies, especially the darkest, there will be a very rich, warm color.

There is always a very delicate velvety look to the prints when properly toned, which is always very much admired, being very difficult to obtain with some baths.

It is made as follows :

Chloride of Gold, ...	2 grains.
Pure Rain-water, ...	24 ounces.

Make the solution slightly alkaline with

Sat. Sol. Sal Soda, about, ...	6 to 8 minims.
Chloride of Sodium (table salt), in weight, ...	$\frac{1}{2}$ to 1 ounce.

In making this bath, I first place the quantity of gold solution I am going to use in the dish at one corner, and in it place a piece of blue litmus-paper, which will immediately turn red. Now take the bottle of sal soda, and drop into the solution in the dish until the litmus-paper turns a decided blue, which will take about six or eight drops. Then place your water in the dish, and last of all your salt. Stir up the contents well, and let stand from five to ten minutes, and it is ready for use.

The bath should be made up as per formula every night, throwing down the gold in the old solution with protosulphate of iron.

In toning with this, or in fact with any of the above baths, should it become exhausted, then add the ingredients used in the first place in exactly the same proportion as was used in the making of it at first.

One of the greatest mistakes that is made in toning by some toners, is in toning the prints until the draperies, &c., are about the right shade, thus disregarding the face, which is the *principal attraction*

of the prints, and to the toner it should always be *the* object of attention. With the toning-bath just described, I will here give the mode of working, which, if followed out, will be productive of excellent results.

This toning should be done in a *quite weak* and *even light*, and at a little distance from the window.

An idea of the quantity of light required may be had by bearing in mind that all you wish is to see *distinctly* and *clearly*, *without any guessing*.

Take a couple dozen of prints, and let them lie in your bath solution face up, *but constantly under the surface*, and keep them in motion while in it. At first the prints will not perceptibly change, but within the course of two minutes or so the high-lights and half-tints of the face will lose their red tint, and will commence to border on the rich purple, and then they will very quickly arrive at that stage when they are to be removed to a bath of running water.

This stage at which the toning is to be discontinued is perhaps at first a little difficult to determine, and you should tone a batch and let your assistant fix them, and when they are fixed, *not before*, you should judge of the tone.

Never take your prints up in your hands to examine them, for you will surely then be deceived, and take them to be undertoned, when by examining them *while lying in the dish* they will appear to be toned plenty.

The prints are toned when the high-lights and half-tints of the face appear clear and a little blue when they are lying down in the dish and examined in a weak light.

Take them out immediately, even if upon looking at them in a stronger light the shadows and draperies should appear as red as fire, for the prints are toned. In nine cases out of ten you will at first *overtone* the prints rather than *undertone* them. *Tone for the lights and half-tints, and let the shadows take care of themselves.*

The salt in the above bath is the improvement of this bath over the common sal soda bath, and it is partly owing to this salt that such beautiful tones can be obtained. In case you *overtone*, the tone will never be a disagreeable slaty one, but rather a pretty blue.

CHAPTER XXIV.

ARTISTIC TONING.

As a rule, in toning the prints, the following will, as a general thing, answer admirably, "Tone the prints just as you wish them to be when done."

Looking over a journal one day, in my earliest days at printing, I saw an article headed "Artistic Toning," and upon reading it I learned several things about toning, and one little clause was the one above quoted.

This clause seemed to me to be very important to the young printer, and I wondered at the time why I had never been told that, and I immediately knew upon reading the above clause that I could tone, and so I determined to tone a batch of prints as soon as possible, and one rainy afternoon, when the printer did not appear after he went to dinner, I resolved to do the toning myself without saying a word to the employer about it. So I made the bath as I had seen the printer make it a score of times before, warmed it slightly, let stand a few minutes, cut, washed, and acidified the prints, washed again, and then commenced to tone them, toning *three* at a time, and as there were only fifty to be toned, being all that had been printed on account of the darkness of the day and the scarcity of the negatives, I did not doubt but what I could tone and fix them all without help. This was the first batch of prints that I ever had the complete management of the toning and fixing of, and I determined to let Mr. L., the employer, and Mr. B., the printer, know that *I could tone*.

With anxious eyes I watched that *first batch* of prints, in fact I *glared* at them, and when they arrived at that stage that I wished them to be when finished, I took them out and set them to washing in running water. When my next batch of prints was almost toned, I placed in the bath a print that was *not toned*, and compared the two, upon doing which I found that I could tone much better. I toned them all finally, fixed, and set to washing.

When through, the "boss" happened to think that there was "*no toner up-stairs*" (so he expressed it, as I afterwards found out), and he came rushing up where I was, to tone the prints before it got much darker, for the weather was lowering, and it was getting

dark pretty fast. I told him that I had toned, and he expressed his surprise and inquired, "Are any of them good?" a question which I did not think very complimentary, I assure you. I told him that I thought quite a number of them were good, and when he, upon looking at them, told me that they were "*very nice indeed*," I felt bigger at the time than I ever have since.

I asked the printer, Mr. B., the next morning, how the prints were toned, and he said, "Very well, only they were toned a little uneven," and upon his showing me what he meant, I determined, as a natural consequence, to do better next time. That little clause led me on, in time, to do the toning in that and other establishments, and more for the reason of showing a young beginner what he can do by a little reading of how *another beginner* did, has led me to write this short sketch of my first attempt at toning.

From the above you see that the idea in toning is to tone the prints until they look as you wish them to when finished, and that toning, in one respect, is not a question of time as fixing is; for you remember that the printer, when he *fixes* his prints, makes up his solution of a certain strength, which he makes sure of by tasting, and then he times them, and lets them remain in the bath so many minutes. Now, the toner who takes five minutes or so to tone a batch of prints would give the impression to the beginner that it was a question of so many minutes, as it is in fixing prints, consequently I have here taken special pains to contradict this erroneous thought, so as to prevent the novice from beginning wrongly, as he would be apt to do if he was in a place where the printer or printers would not take any pains to show him, but would be constantly on the hurry to get through as soon as possible.

Now, since you are to tone the prints as you wish them to look when finished, let us see if you have the *right idea* in your mind as to how they should look when toned.

You should not wish to have them what may be called "*red tones*," *i. e.*, to have the background, draperies, hair, and the *face* as red as a brick, or in fact anywhere near it.

You should not tone them so that the draperies and shadows look *blue*.

Rule: *You should tone until the face is slightly blue, and then the prints should be taken out, even if the rest of the printed paper is quite red.*

With some baths, especially such ones as the "*acetate of soda*," and the bath described last in the preceding chapter, this can be done very easily and successfully; but there are some baths, as the "*citric acid*," "*chloride of lime*," &c., that this treatment cannot

be used so well, and in the case of the "citric acid toning-bath" the shadows also will have to be regarded, else the whole print will be as red as a brick.

But a little experience in toning with any one bath will give you an idea as to how far you should tone before you discontinue the operation, and set the prints to washing. You may say that which I have just written will conflict with the rule given above, but *it does not*, for the only difference is this: with one bath you can *tone full strong*, and with another one, when the proper state has arrived, the prints should immediately be removed, and *should not* be allowed to remain in the bath until the tone has reached the *more decided stage*.

In baths containing either the acetate or the chloride of sodium, or both, in their composition, the above rule should be strictly carried out.

The beginner should also bear in mind that he should endeavor to *tone even*. By toning even I mean to *tone all prints of the same person alike*.

Some of my readers might say that it means *to tone the whole batch of prints to the same tone or tint*.

Now, I suppose that this could be followed out, but would it be called "artistic toning" to tone blondes, blondines, and brunettes all the same tint, and make the light hair in one print *red* when it is not; black hair in another one *red*, and red hair *black*, &c., &c.?

You may say that *red* hair takes *black*, which it surely does, but if it lies in the power of the toner to tone the hair *red*, at least a little so, should he not do so?

Another person may have black hair, should not the toner get a good dark-brown tone on the print, so as to make the hair look black (which it will do when the print is dry), and thus make the print more in keeping with the original?

Should not a blonde have her hair look light in tone, and neither red nor brown, but about somewhere half way between?

The negatives of the last-named class of subjects are generally so made that when you tone the face, as per rule given above, the hair will be all right.

So it is generally in by far the majority of cases, the yellow and red hair being exceptions. Of course you cannot obtain, and I doubt if you wish to, *yellow tones* for the hair, but if such hair is taken nicely in the negative it will very often come round to the right tint in the print, without making the rest of the print appear at all yellow, but of a light brown tint. While writing this I have in my hand such a print, wherein the hair is of a faint yellow tint, and the draperies, background, &c., are of a rich brown tone.

I have obtained many such tones as this one by the use of the "citric acid toning bath."

Excellent tones for the red hair, with clear high-lights and half-tints in the face, are easily obtained with a bath containing chloride of sodium in its composition. The young beginner might obtain a few ideas by the close perusal of the preceding chapter about toning-baths.

You might say that it is a difficult thing for a toner to tone his prints in the style spoken of above, and also that he cannot tell when the hair should be a decided red, black, or medium, on account of his never having seen the original. For this reason it is advised by some photographers that the operator should do the toning, as he knows more about the "style of beauty" than the printer who never sees the original.

As far as lies in the printer's power he should tone the prints as near as he can to their proper color, and his guide should be the original.

A lady, who was the possessor of "*lovely (?) auburn hair*," once said to a photographer :

"Why! you have made my hair *jet black* when it is *auburn*!"

"Yes," said a friend, "they have made your *lovely hair black* sure enough!"

Red hair was the fashion at that time.

I know of many first-class photographers that dislike the red tones for the reason, as I have heard them say, "they are not artistic."

An excellent photographer in Boston, Mass., once said to the writer: "I dislike the red tone, because it makes the hair of some people red when it is jet black, and I never let my toner tone so red as to make the hair look at all so, but I request him to obtain a rich brown tone to his prints, and then they will be more in keeping with the original in the *majority* of cases."

There is a great diversity of opinion among first-class photographers about the proper kind of tones to be obtained, as many of us are aware, and would it not be better for us to go by the advice of those more skilled in the art than what some of us are?

I myself have always admired the German portrait stereographs, the tones of many of which I think are perfect.

It is not only in the portrait work that this toning is to be so observed, but it should be more so in landscapes, marine views, &c.

Always tone them more than what you would portraits, as red tones on views are abominable, and then by toning them a *rich brown* the finished print will look as the views do in nature, and trees,

rocky bluffs, fences, wood-piles, water, logs in water, reflections in the water, steamers, &c., will all be delineated in the print with wonderful fidelity.

I have in my hand, at the present moment, one of the best-toned stereoscopic photographs that I ever saw. The beauty of its tone consists in its perfect trueness to nature ; at least it is as far perfect as lies in the power of the toner to make it.

Artistic toning of stereoscopic views can be seen by examining a collection of Kilburn Bros., Littleton, N. H., and artistic toning of portraits by examining those of Fritz Luckhardt of Germany, Sarony's, Gurney's, Howell's, &c., of New York.

It would be a good thing for the young beginner to get his employer to purchase for him a dozen or so assorted prints from those galleries. I did so, and from the study of them I derived considerable knowledge besides much pleasure.

Weak prints should be toned in a very weak toning bath, as when the bath is very nearly exhausted, and *face up* in the solution.

Intense or hard prints should be toned quite quickly in a strong bath, and *face down* in the solution.

Prints face up in the toning bath tone slower than when face down.

Weak prints, in all solutions, should be subjected to mild treatment.

A black tone is obtained by toning full strong in almost any bath if it contains a trace of chloride of lime.

A chocolate tone is obtained by toning a little longer than what you would for a red tone, in almost any bath except the chloride of lime bath, and sometimes it can be obtained in this bath in a greater or less degree, according to the quality of the negatives.

A decided brown tone is obtained by toning a trifle longer than what you would do to obtain a chocolate tone.

To obtain a purple tone you should tone between a chocolate and a brown until the print commences to show the *least possible signs* of this tone, then take it from the bath, and fix and wash, and when it is finally all finished it will be purplish in tint. The "sal soda bath" is excellent for these kind of tones, and they are quite easy to obtain, especially if the prints are strong, bold, and possess good toning qualities. A "nitrate of uranium bath" is also excellent.

A blue tone is obtained by almost any bath, but a good, clear, and pretty blue is a little hard to obtain, unless the negatives from which the prints were printed are excellent ones, containing good toning qualities.

The "bicarbonate of sodium" is an excellent bath to obtain rich blue tones.

All of the above tones are obtained more by removing a print at certain stages of the toning from the solution than by any particular bath, although some baths may be better than others for producing particular tones. It is, in a great measure, however, simply a matter of taste and experience.

CHAPTER XXV.

FIXING BATHS AND FIXING PRINTS.

As has before been written in one of the preceding chapters, the prints need a fixing agent to remove all trace of the silver in them.

This fixing agent used is hyposulphite of sodium, and a bath of it is made of a certain strength by dissolving this in a quantity of water, and the prints are immersed therein for a number of minutes.

Cyanuret of potassium is never used in fixing the prints, although it is sometimes used in fixing the *negatives*. The reason of this is because it spoils the beauty of the tones, bleaching the prints fearfully, and on the whole is a miserable fixing agent to use for delicate photographs.

There is a diversity of opinion among photographers about the strength of the fixing bath, some using it much stronger than others do.

I, myself, am inclined towards having a weak bath, and fixing a longer time than what I would with a strong bath, as the action will be more gentle, and on the whole better results are obtained by so doing, and blistering and bleaching are, in a great measure, cured. It is very important that the hypo bath should be made up every time you require its use, as old hypo baths are very injurious to the prints.

Take a two-gallon bottle, and place in it about one pound of the hypo crystals, fill up with water, shake well, and label this bottle "Sat. Sol. Hyposulphite of Soda," and when you have made it saturated, you are then ready to make the bath as per formula given below. To be sure that this hypo solution becomes saturated, make it up at least two days before you wish to use it. Just before using, shake the contents in the bottle for about two minutes.

When you wish to make the bath, take of

Sat. Sol. Hyposulphite of Sodium, ...	1 ounce.
Water, ...	8 ounces.
Sat. Sol. Bicarbonate of Soda, ...	$\frac{1}{4}$ ounce.

Large quantities in proportion.

Make it up in a dish, which is kept expressly for this, and this alone.

The bicarbonate of soda is used in the fixing bath for the purpose of making alkaline any free acid there may exist in the solution.

This is very important, for in case the solution should happen to be acid, it would finally be the means of liberating sulphur and forming sulphide of silver, and it would deposit itself on the prints, affecting them seriously in look, tone, and permanence.

Aqua ammonia is sometimes used for the same purpose, but if it is to be used, only a few drops of it are necessary, as any more will cause the albumen on the prints to become very tender, giving a look of transparency to the whole print. The prints are very easily torn when the ammonia is used to excess, on account of the softness of the paper. On the whole, I think it better to use bicarbonate of soda, as it is, as before said, a much milder alkali than ammonia.

During the cold months of winter, and also at all times when the water is cold, the soda solution should be heated to about a lukewarm state (no more), as the action of freezing hyposulphite of soda solution will be very slow, and also injurious to the prints, causing innumerable blisters all over the prints.

An assistant should pass the prints from the washing-tank, a number at a time (so as to get them in as near as possible at the same time), and place them in the hypo bath (without touching the hypo solution with the fingers while passing the hands from one to the other), and the operator at the hypo bath *should separate and cover them with the solution as soon as he can*, for if this is not done, and the prints are fixed imperfectly, they will then have mottled yellowish-brown spots all over them where they have been laid together, and which are very observable when washed and dried. More about imperfect fixing, &c., at some future time.

After you have had all the prints placed in the bath, then note the time by the clock.

Keep the prints in constant motion while in this bath, and do not allow one single print to stick to another, even for the space of ten seconds, if you wish to have them properly fixed.

Too much attention cannot be given to this little thing if you wish to have your prints fixed evenly, and not have them come out when finished full of darkish-brown spots, yellow stains, &c.

The reason why I have advised you to have an assistant place the prints in the bath for you is, because if you are inexperienced in doing it yourself, you will be apt to get some of the hypo on the prints before they are wholly placed in the bath and under the solution, and when you do that they will be spoiled, and all of the subsequent fixing will not remove it. They will be stained, and among other things there will be the so-called "finger-stains," caused by the fingers having had hypo on them when the prints were taken up, just after toning and before fixing.

After the prints have been in constant motion for full eight minutes, look through them by holding them, one at a time, between you and the light, and after you have looked at a dozen or so, and the shadows, hair, &c., present a clear transparent appearance (and not at all mottled) to the critical eye, the prints are fixed. If they are not clear, let them remain in the bath until they are. An experienced "fixer" can tell in a few moments whether they are fixed or not by doing as has just been said.

If the prints are fixed, then pour off about one-half of the solution in the dish, and fill up with an equal quantity of water. Move the prints continually in this water for about five minutes longer, then pour off about three-quarters of this, and fill up again. The reason of this is to get the density of the liquid down gradually to that of water, so that the prints will not blister, which they would surely do if they were placed directly from the hypo into the water ready for washing. Alcohol placed in the hypo bath answers the same purpose.

Some printers (myself among them) place their prints, after they are removed from the hypo, in a bath of salt-water, made by placing a handful of table-salt to every gallon of water. Let them remain in this from five to ten minutes, and then set them to washing. The object of this salt is not only to displace the hypo from the prints so that they will wash better, but also to prevent them from blistering in the subsequent operations, and when already blistered to cure it.

CHAPTER XXVI.

WASHING THE PRINTS.

THE prints, after they are removed from the salt-water bath, are then to receive the final washing, which will render them ready for the further operations, such as mounting and finishing. I would

here most earnestly advise all printers to allow their prints to soak about ten minutes in salt water, as written in the preceding chapter, before you proceed to wash them, as besides saving the annoyance of having blisters on them, they will also be much *more easily washed*.

This washing is the most important of any of the washings before mentioned, because if it is insufficiently done, the result will be much more disastrous than any of the others. The other washings were only to prepare the prints for other solutions, and it was not so important, as the silver would finally be removed in the fixing-bath. But in this case, when you discontinue the washing and proceed to mount the prints, they will then in the future be good, bad, or indifferent, according as to how the final washing was done. This destroying power which is so necessary to be removed is the hyposulphite of sodium, a considerable quantity of which still remains in the print. The theory of washing is that the water gradually displaces the hypo in the prints, providing the washing is permitted to continue long enough, and then the prints can be mounted and dried without any danger of bad results from further chemical action. The young beginner can thus see the necessity of frequent changes of water to remove this destroying agent, and hence it would be a good plan for the first half hour or so after the prints are fixed to wash them by hand, and then trust to the washing apparatus, whatever that may be. In small establishments this washing is done by permitting the water to run into a dish at one corner. When they are so done, it would be best to do as recommended, as they are likely to be all together the greater part of the time when thus washed.

The Moulton Rapid Print-washer is highly recommended, and is said to do the work very quickly and thoroughly.

Washing by hand can be done in the following simple yet effective way:

Take a suitably sized dish, fill about half full of water, and when the prints are removed from the salt water, place them in this bath of clear water with one hand, while with the other you place them under the surface. When the prints are all placed in this bath of water, then move them all about for five minutes, and then pour off the water and fill up again, and let them stay in five minutes more.

Do this for four or five times more, using lukewarm water, as it will do the work quicker than cold, and then they will be ready to wash in the dish, as above described, by arranging the hose so that the water will run through and between the prints. When there

are only six or eight scores of prints, they will be washed in a short time.

The great secret in washing prints is to keep them separated from each other, thus permitting the fresh water to move between them all of the time.

In large batches of prints, say twenty, thirty, or forty sheets of paper, this washing cannot be done in so simple a way as the above, hence it becomes necessary to have a washing-tank that will, on account of its peculiarly adapted make, wash the prints perfectly, and a longer or shorter time is required according as to how thoroughly the tank does its work.

To keep the small *cartes* from getting between large prints, say 14 x 17, and even larger ones, and thus getting imperfectly washed, a series of washing-tanks are arranged, a large one of which is intended for the washing of large prints alone, and a smaller one for the *cartes de visite*, Victorias, and Imperials.

Every photograph gallery has some sort of a tank which is intended for this washing, and I will mention here that these final washing-tanks should never be used for any of the other operations, such as the other washings, fixing, &c.

These tanks are more or less perfect in performing their work, but there is one idea that is generally carried out in them all, and that is to have an outlet in the bottom of the tank or tanks so arranged that, without sucking the prints in, the water can be let out at the opposite side to where the fresh water is supplied.

To keep these prints in motion while washing, and thus make them "*self-washing*," a rotary motion is given to them on account of the manner in which the water enters the tank. A half-inch pipe generally runs along the inside of the tank, suspended midway between the top and bottom, and having small holes so made in it that minute streams of water strike the water obliquely in the same direction and at different parts of the surface, thereby causing the water to rotate around the tank, carrying the prints with it.

The tank is so made that the diameter increases as it proceeds towards the bottom of the tank, so as to prevent the prints from sticking to the sides of it, and to be doubly sure that they will not adhere to the sides there is on the under surface of the pipe an array of small holes running the whole length of it, sending small streams of water down the sides of the tank driving away the prints which may be there. To prevent the apparatus from overflowing an overflow is made, which, when the water has reached that level, it can be run off without danger of carrying the prints with it. But better still are those tanks which are got up on the siphon plan, and then

when the water has reached the proper level (which you can regulate) it is all let off, leaving the prints on the bottom of the tank, which is, of course, so made as to prevent any hurt coming to the prints.

A washing apparatus got up on the siphon arrangement, and emptying itself every twenty or twenty-five minutes, is one which I used in a printing-room of an excellent gallery for a number of months.

It slanted outward as it proceeded towards the bottom, for the same reason as was stated above, *i. e.*, to prevent the prints from sticking to the sides.

The pipe in it was arranged as was described above, and the bottom of the tank was covered with small pebbles about two inches in depth, which are or should be evenly distributed. Close to the bottom of the tank, on the side, a hole was made (hid from the prints by a piece of glass, the edges of which were ground smoothly), which permitted the water to pass through by means of a little iron pipe (varnished) two inches in length, which fits in *exactly* close to the wood. About an inch of this pipe projects beyond the tub, and a piece of suitable rubber hose is fastened and bent in the form of a siphon, the higher level of which is fastened by a wire in its proper position. When the water in the tub has reached the highest level of the siphon, the water, which has been gradually working up in the hose, will flow therefrom, and in a few minutes the tank will be emptied of the water, although there is a stream running in all of the time. The prints will be gently let down into the pebbles, and the water, after it has ceased to run out, will again cover the prints, and set them afloat before they have hardly stopped draining.

The supply water never should enter the tank nearly as quickly as the siphon carries it off when it has once started. No danger need to be apprehended from the drying of the prints while the tank is filling up again after it has once been emptied.

For large prints this is not very good, especially if there are a quantity of them, but on the whole it is a very good arrangement.

In large establishments the prints are generally allowed to wash all night, and if there are many to be washed it had better be so done, unless the whole of the washing is done by hand, and then a shorter time will answer.

Prints which are toned and washed Saturday afternoon should be washed by hand and mounted up before you leave the establishment for the night, as remaining in the water over Sunday will very much affect the prints; for, of course, they are not to be mounted on Sunday. In some establishments the printers do not print pho-

tographs on Saturday, but spend the day framing, making porcelains, &c., &c.

The prints should be tested before they are removed from the tank for the purpose of being mounted, to see as to whether they are perfectly washed or not.

Dr. H. Vogel, in his *Handbook of Photography*, recommends a mode of testing which we will here give.

First, we will give his mode of preparing the "Iodide of Starch," which is used in testing.

"One grain arrowroot is mixed with a few drops of cold water; next about 100 parts of distilled boiling water are poured on it, and afterwards 20 parts of chemically pure saltpetre are added to make the paste keep. To the solution of starch 20 grains of a wine-yellow solution of iodine in iodide of potassium solution is added (a bit of iodine thrown into a solution of iodide of potassium 1:20 will furnish this in a few seconds). This will give a blue solution of iodide of starch, which will keep for about four weeks."

"When the washing is finished," says Dr. Vogel, "the pictures are separated under water, and a portion of the last water is taken from the box. For the purpose of testing, two test-tubes of equal size and perfectly clean should be selected; in each an equal quantity of a solution of iodide of starch should be filled; to the one tube fresh water from the reservoir is added; to the other an equal quantity from the last water in the wash-box. It remains only necessary to shake both tubes well, and to hold them against a piece of white paper in order to ascertain if in one of the tubes a discoloration has taken place. The greatest cleanliness of the hands and test-tubes is necessary. Even with a millionfold dilution the presence of soda can be detected. When the test shows that soda, or even a trace of it, is still present, the washing should be repeated. When we wish to test finished pictures by this method we must soak them first in water, and then test the water as described above."

Before you proceed to remove the prints from the tank let off all of the water in it, and rinse them well in a bath of clean rain-water, so as to remove all traces of the iron-rust and settlements from the water, which may have been carried in the tank through the supply. Rinse the prints in two or three changes, so as to get them as clean as possible, and they will be much nicer and cleaner when they are finished. When the prints are removed from the tank always rinse it, and fill up again with fresh water, and it will be ready for use next time. If the pebbles are used in the tank they should be washed every day. If the tank is made of wood then once a week or fortnight let off all the water in the morning, and dry it thor-

oughly, and varnish all over the tank and pipe with some shellac varnish, and you will keep the tank in better condition by so doing, being more easily cleaned in the future from settlings, &c.

Once in every two or three months scrape off the old shellac with a broken piece of glass, and varnish it anew. Too much care cannot be given to this, and in fact to all your tanks and sinks, for they should all be shellaced.

All of these little things help towards making fine work.

CHAPTER XXVII.

MOUNTING THE PRINTS.

OF all subjects of photography, this has received the least attention.

The simple process of mounting is a thing of some little mechanical skill, as I think all photographers will agree with me in saying.

The making of the starch paste, if that is used, is at first a little troublesome to the beginner, as is also the glue, gum, &c., and then the placing of them on the cards, although a mere mechanical process, should be done well.

In galleries where only two or three hundred of small cards are printed in a day, surely these few, when compared to fifteen or twenty hundred, which is the *daily average* in some galleries during "the harvest," ought to be mounted well, indeed excellent, when we consider that all that is required to make them so is only a little care.

What is the effect left upon our minds when we examine prints that are nicely printed, cut, toned, &c., and are mounted badly? Does it not strike us unfavorably? I think it does.

It is acknowledged by many photographers that the starch used in mounting is the cause of their fading, and the reason why this is so universally used is, because all photographers have learned to make it, and as they are either ignorant of its effects on the prints, or if not ignorant, too careless or heedless to take measures to prevent the use of it.

But if this mountant is really the cause of their fading, which I think is partly true (but I also think that too much blame is given to it, when careless manipulation has considerable to do with it), why is it then used?

I have mounted prints with *starch*, and one day, after mounting a batch of them with it, I saved a few for myself for the purpose of experimenting, and wrote on the back of the mounts such writing that would tell me at some future time why I had saved these particular prints.

I experimented considerably with them, and placed them in a very dry atmosphere for a month, then directly in a very damp cellar for another month, in a dark album for a fortnight, among the samples of work in the reception-room, on a shelf in the chemical-room for a week, in the dark-room for a fortnight, where there was a strong smell of cyanuret of potassium, ether, &c., down cellar again, under strong diffused light for a fortnight, in the damp-box for a week, and in spite of all these tests *I could not get the prints to show either stains, bleaching, cockling, or fading.*

Verily they were tested well, and "they stood the test like a martyr."

It is said by many, and as far as theory goes it is correct, that the starch used in mounting the prints would ferment if the prints were exposed to various degrees of temperature, such as dampness and dryness.

As above stated, theoretically this is the very best reason why the prints would fade, but in practice they do not fade so quickly after all, as the above test has proved to me, for I do not doubt but that the prints were exposed to more changes as regards temperature, odor of chemicals, &c., than what comes to most prints during twenty years, and if they were to fade at all, I should think that the above would do it, and with one exception, viz., age, they have stood a greater test than, as before said, the generality of prints have ever received.

We have photographs in our family album that were taken twelve and more years ago, many in New York, Boston, and other places, and which have been through a variety of changes, such as being on the ocean for months, both in tropical as well as in the colder climates, having been in Cuba for several months, as well as in climates where, I have been told, the atmosphere is about always damp at certain periods of the year.

Upon inquiring, I have been told that the photographs were not kept in the album, except at sea, but were placed on mantelpieces and around the shelves in the family sitting-room; and thus changes were thoroughly given to them; and to-day, as I am looking at them, I am told that they have neither faded, and as I myself see, they are not stained, or the whites discolored, from insufficient washing, &c. Surely they were made well. I am taking for granted

that they were mounted with starch, as that is the universal mountant.

Now, I do not mean to say that prints *never fade* from the fermenting of the starch used in mounting, for I think that if they were kept for many months in damp places they might possibly fade, but this is, I really believe, very seldom the cause of their fading.

A very good way to make this paste is to first dissolve the starch in a little *cold* water in a suitable dipper. Now obtain some *boiling* water, and keep pouring a small stream of it in the dipper where the dissolved starch is (keeping the dipper on the hot stove), stirring the contents *quickly* all of the time. When it is thick enough, then stop the pouring in of the water, and stir well until the starch *commences* to boil, at which time it should immediately be removed, and your paste will be nicely made, and there will be no lumps in it; if after it is cooled you remove the upper crust, and you will not burn the starch, as beginners are apt to do the first few times they make it, neither will there be any "cobble-stones" in it.

Glue is an excellent mountant, and is used by many skilled photographers.

It is made as follows :

Obtain some of the best *clean light glue* and soak the whole of it in cold water over night. The next day, strain off the dirt in the water and then pour the thin glue-water back again into the dish. Dissolve the glue as it is on a hot stove or over a small jet of gas, adding *hot* water to it in case it is going to be too thick, which you can easily tell by stirring the contents of the gluepot with a stick. After it is all dissolved and ready for use, strain the whole through two or three thicknesses of muslin in a clean and suitable size gluepot. While using the glue, place it in a dish containing *hot* water, and the glue will be kept in a good condition for a couple of hours, and longer still if the water is kept always hot. This can be used day after day as required, by dissolving and adding more water as necessary.

If the glue is *clear* and *light in color* it is an excellent mountant, and I prefer it to starch. Its use is complained of by some because, they say, it cockles the prints, and a little of the best white powdered sugar is added to keep it and to prevent it from cockling. Two reasons of this cockling, when using either glue or starch (whichever it may be), are using it *too thick, as well as too thin*, and then again, in insufficient "rubbing down" of the prints after mounting.

The small prints, as they are removed from the water, are laid in a neat pile face down.

A suitable size glass, say 8x10, is covered with the same size piece of clean unsized paper, which is thoroughly wetted, and when the prints in the water are thoroughly rinsed, they are laid in a perfectly even bunch on it, the different sizes to themselves. The paper laid on the glass serves to keep the prints damper than the bare glass would. Use clean paper every time you prepare to mount the prints.

The prints are mounted for convenience in a *wet* state. The object of mounting with the starch or glue, as the case may be, is to fill up the pores, and thus bring the print in perfect contact with the card-mount, which is aided very much in the so-called process of "rubbing down."

You should apply the starch or glue to the prints quite thinly, and after laying them carefully on the mounts, lay a sheet of thick writing-paper, or better still, some unsized printing-paper, on it, and rub the prints, commencing at about the centre and rubbing outwards, which process will perfectly remove all air-bubbles from under their surface. Then bend *backwards* the mounted print, and rub the finger along the edges carefully of all the sides of it. I recommend bending in of the back of the mount, because, in drying, the print draws the thick cardboard inward, and this counteracts it, and the dried prints will be flat, and can consequently be finished better. The prints should be allowed to dry spontaneously, and then they would not be so likely to cockle as they would if they were dried by the fire.

In mounting large prints, lay a print at a time on some thicknesses of clean paper, and where there is no trace of starch, and after pasting mount it on a suitable size cardboard, and rub well from the middle outwards as in the small prints, examining afterwards to see as to whether there are any air-bubbles which escaped notice, and if so, be careful to remove all of them. When applying paste to the print for the purpose of mounting, examine the surface, and if there are any hard bunches of paste, dirt, &c., even if in a small quantity, as a lump or two, remove them with the finger-nail, as these places will show after they are mounted, and spoil the looks of the work.

Dry these large prints in a suitable size book, kept for the purpose, and under a sheet of blotting-paper, and when they have been there an hour, remove to another place of the book, under *fresh* and *dry* blotting-paper.

CHAPTER XXVIII.

FINISHING THE PRINTS.

WHEN the prints are mounted, all spots are to be touched out, and the high-lights in the eyes, &c., are to be placed in, as will be presently shown. It is not at all necessary to wait until the cards are dry to do this, but, on the contrary, it is perhaps better to touch the spots out while the cards are damp, so that if an ordinary roller is used the prints can be rolled while a little damp, and a better polish is thus secured.

When the beginner commences this work on the prints, he will then, if not before, see the importance of thoroughly dusting the negatives while printing, as the neglect of it will here occasion him considerable trouble, as well as the final result not being so nice as it would be if there were no such places to be touched out.

For this reason I have often thought that if the beginner was served as I was when I commenced to print, it would be a good thing. It was to assist at printing on one day and the next to assist at the touching of the prints, for the space of a fortnight or so, and thus he would learn how much trouble was saved by a little care being taken in the first place, and a valuable trait towards making a good printer would be early acquired. But even if the greatest pains were to be taken in the dusting of the negatives, there are instances in which it would not prevent some places from printing: said places being in the film that is on the glass, occasioned in some of its manipulations, such as the varnishing, or by some defect in the glass itself, either scratches, bubbles, or something of that sort.

It is on account of the unnecessary trouble occasioned in the touching out of these spots that I have, in a previous chapter, recommended not to "touch out holes" in the film any larger than what is necessary, and also where there are scratches, whether large or small, to print the negative either under one or two ground-glasses, and even sometimes a tissue-paper, so that such places will not show any more in the resulting print than what is really necessary.

A good printer will assist those whose duty it is to do the mounting and finishing of the prints as much as it is in his power, as well

as the position artist, operator, or chemical manipulator tries to assist him (the printer). A very noted New York photographer once said to me :

“In my gallery, the object of those in each department is to assist each other as much as lies in their power, by doing their work so that they will not have to rely upon the person or persons whose duty it is to do the next in routine to cover up their defects ; for there is always enough of their own work to do, without doing any more of another’s than what is absolutely necessary.”

There is no small amount of work to be done by the lady in touching out the *absolutely necessary* spots on the prints, as any one who has ever tried to touch out can tell for a certainty, it being likened unto the work of a negative-toucher, both of them being more or less severe on the eyes.

Any good brush, of a suitable size and with a good point, will answer for this purpose. In the mixing of the colors, which should be done every day, proper attention should be given to obtaining the same tint, as the tone of the print indicates to you, so that the touched-out places will have the same appearance as the rest of the print. Water colors are used, India-ink, yellow and red colors predominating in the mixing, according to the tone you desire, which is generally of a reddish tint.

In applying the color to the prints as it is now, they will dry dull, and when looked at obliquely these dull spots will show badly, on account of there being a glaze to the print everywhere except where this color is applied. To obviate this, a liquid solution of gum arabic (made by dissolving the gum in as little water as possible) is mixed with the colors in such abundance as to give a good gloss to the prints when they are touched.

More often, instead of dissolving gum arabic as described above, a lump of the pure gum is wetted with the tongue and rubbed through and through the mixed color, and the remainder of the lump is stuck to the palette upon which the color is to be mixed. In touching out, in case the color after a while shows no signs of the arabic, then first rub the wet point of the brush on the lump of arabic, and then take up some of the color and proceed to touch out the spots as before. The use of the arabic makes the color a trifle more difficult to take to the prints, but after awhile you will not notice it. A glass of clean water should be near at hand for you to wet your brush in and to cleanse it when necessary. The beginner, in touching out with the brush and color, should be careful and not touch too heavy as well as too light, and never leave a spot unless the color applied gives the same dark tint as the surrounding places,

and he should not touch out a larger spot than what the spot really is. A little experience will tell him what is to be touched out, and what is not.

All dirt spots (*i. e.*, light spots on the prints which are usually caused by dirt adhering to the varnish of the negative) should be touched out wherever they occur. The most noticeable places are in the draperies, face, background, &c.

The *unevenness*, if there is any, of the retouching should also be attended to, *i. e.*, those parts on some parts of the face which are lighter than the surrounding parts, caused by the pencil of the retoucher taking too heavily.

I mentioned above about placing the high-lights in the eyes, and as the beginner may not know what I mean by it I will here explain.

In many prints the eyes, owing either to the carelessness or ignorance of the operator, have no high-lights in them, and when such is the case they should be placed in each eye, at the proper place, by the brush, upon which a little white paint (water color) is dissolved.

The greatest experience is required to do this as it should be done, and the apprentice should never attempt it on his own responsibility until he has been thoroughly taught how and where they should be placed. In many cases the high-lights should in a measure be touched out, *and all other reflected lights* should be removed.

A common lead pencil of a medium grade of hardness is used for the purpose of modelling the face, as well as touching out the slight spots that are in the face, draperies, &c., whether occasioned by the retoucher in touching the negative, or by the printer in printing them.

The Siberian Graphite, No. 2, H. B. pencil, I have used with very good results.

A good not too sharp point is made, and a slight touch of it will very neatly touch out the thin and long dirt spots, and in modelling, both in the lights and shades, it is capital. There will not be enough difference in the tone of the pencil-mark and the color of the prints to cause any attention from this source, unless the places are larger than the head of a tolerably large common pin. The pencil very often reaches places more easily, and can be used quicker than a brush, therefore it is used considerably, when it can be, with good results. For diving in between the shadows in the cheeks, and filling them up (not too much), and touching out those dirt spots which may happen to show on the high-lights, and in all places where only a very slight touch is required, the pencil is much better than the brush, as it will make a much better mark.

To ease the eyes in touching out the minute spots a large mag-

nifying-glass is placed conveniently in a sort of a vise, by means of a suitable rod which is attached to the glass.

This glass is placed at some six inches from the prints, and the person touching out can not only do the work better, but the trying of the eyes is in a great measure prevented.

A little flesh-wash is given to the cheeks and lips of the ladies and children with good effects.

ROLLING THE PRINTS.

The prints, after they are properly "spotted," are ready to be rolled, which should be done at the time when they are slightly damp, as a better polish is then given to them.

There are a number of presses in use which are generally good. A nickel-plating is given to many presses, because it prevents their rusting.

There are, of course, a number of different size presses for large and small prints. The common *cartes* and Imperial prints should never be rolled on the large press.

The press, before use, should be thoroughly cleansed with a piece of cotton-flannel and a little common alcohol.

When not in use always keep the presses covered. About once a week they should be thoroughly cleansed and oiled with a drop or two of sweet oil.

When the press is cleaned the prints are, one at a time, to be placed in between the rollers, either face up or face down, according as to which roller is the polisher. They should be placed in with the left hand, while with the right the crank is turned. The pressure at the press should not be so heavy that the operator at it will experience any difficulty whatever in turning the crank with one hand, while the press is fed with the other.

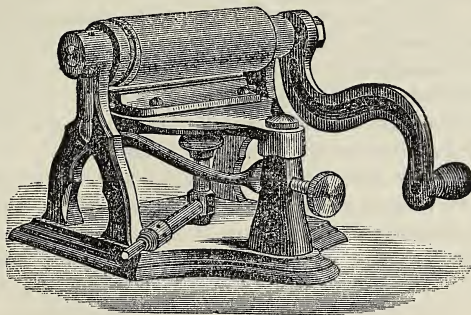
Do not stop turning the crank while a print is between the rollers, or it will be creased, and consequently ruined.

Roll the print once lengthwise, and then twice sideways, and when the roller has taken hold of the card on the one side, place your hand over to the other side of the press where it comes out; take hold of the card when it appears, and bend it so that the back will bend in slightly, and thus give the picture the look of being pressed forward. Bend in the back of the card but a very little however.

Entrekin's Oscillating Enameller, Fig. 40, is an excellent thing, and should be used more, and then again less; more by a greater

number of photographers, less in obtaining *so much gloss*, which is generally overdone.

FIG. 40.



The enameller is good for several reasons, among which are the following :

- 1st. It decidedly improves the tone of the print.
- 2d. It makes the general appearance of the print richer.
- 3d. It gives transparency and beauty to the whole print, especially in the shadows.

The prints, after they are rolled, are ready to receive the final treatment, which ends the processes through which they have to go before delivery.

WAXING OF THE PRINTS.

For the purpose of finding the best thing for waxing the prints, I have at the expense of considerable time experimented, and I have, I think, succeeded in finding what I was after ; and although it is not new, yet I can recommend it to be the best—of more than a score of kinds of pastes that I have made—mainly on account of its cheapness, and simplicity in the making.

Marseilles soap is most generally used in the making of this paste, and for those who may wish a formula containing it the one below will be found to be excellent.

Virgin White Wax, ...	2 ounces.
White Marseilles Soap, ...	1½ "
Boiling Water, ...	2 "

Cut both the wax and soap into very thin slivers, and place in a clean china mug containing the boiling water, and place the mug with its contents into a tin-pan also containing boiling water, the whole of which is placed on a hot stove. Add the wax and soap, a portion at a time, until all are dissolved.

I recommend the dissolving of the soap and wax in small quantities, as it will be more thoroughly done.

In obtaining Marseilles soap always procure the white, and never the spotted. While the wax and soap are dissolving stir thoroughly with a clean glass rod. This paste, when made, will have the consistency of "*cosmoline*." When cooled, it is ready for use, and should be applied as will be given below. A few drops either of the essence of lavender, cloves, citronella, rosemary, bergamot, &c., may be added to give an agreeable odor to the paste.

There are other formulæ containing benzole, oil of spike, gum elemi, &c., in various proportions, which ingredients being a little difficult to obtain, and to prepare, it is a matter of considerable trouble to the beginner, consequently I will not place them here.

Out of all of the different kinds of paste I have made, I have settled down to that of plain wax and spirits of turpentine.

It is made as follows :

White wax is placed in a common clean china mug ; which mug is placed, as above described, in a pan containing water, which is kept at a boiling state by being placed over the gas-stove.

Dissolve about two or three ounces of the wax in the mug, and then gradually add about three-quarters as much spirits of turpentine as there is dissolved wax, stirring well all of the time, and finally add of some essence—as the essence of bergamot—in quantity sufficient to destroy the smell of the spirits ; said quantity being about half an ounce. Stir the whole thing well.

FIG. 41.



So that a quantity of photographs can be waxed in a comparatively short time, I made a couple of wooden frames (Fig. 41), one for the small *carte*, and another for the Imperial.

They are very simple in construction, being merely a suitable-size piece of planed pine wood (upon which the back of the card rests while waxing), with narrow strips of wood nailed on the top, bottom, and on one side of them.

The prints are placed in these frames for the purpose of keeping them from slipping about. Instead of having the strips A A A fastened to the main board, as it is in Fig. 41, they (the strips) can be movable, and fastened to the print when necessary by means of a thumb-screw.

By the aid of these frames I have thoroughly waxed one hundred *cartes de visite* photographs in an hour and a quarter.

This paste should be applied to the prints by placing a small quantity on the hardest (*i. e.*, the unnapped) side of some Canton flannel,

and rubbing it well over every part of the print, and then with another and a cleaner piece of flannel the surface of the print is rubbed briskly until quite dry, and then the final polish is given by using the soft (napped) side of the same piece.

I have recommended to use the harder side of the flannel first, because if the other is used before the greater part of the wax is rubbed dry it will remove the stringy cotton stuff, and thus it would be rubbed in the wax on the surface of the print, which will, especially when looked at obliquely, show very badly. Rubbing quickly will give a most marvellous polish to the prints, especially if it has previously been rolled, and assists wonderfully in bringing out detail in the deep shadows, and also gives a fine effect to the whole print.

Soiled photographs are rendered so clean by the use of this paste that they will look like fresh ones.

The prints, when waxed, should be allowed to remain all night, or at least for a few hours, in a cool and thoroughly clean room.

Part II.

PLAIN PAPER PRINTING.

CHAPTER I.

SALTING THE PAPER.

To be sure to have a good quality of paper for sensitizing, we almost invariably salt it ourselves; and as it is not at all difficult to do, we should advise our readers to do it.

There are in the market a number of good papers, which can be purchased and be relied upon as being excellent; two of these are Anthony's Tapioca and Clemons's Arrowroot papers.

When the printers wish to salt their own paper the following formula will be found to be excellent:

Pure Rain-water, ...	60 ounces.
Chloride of Ammonium, ...	360 grains.
Gelatin, ...	120 "

We add the gelatin to the solution, as it gives a much better surface for the ink-worker to work on. Mix in a large wide-mouth bottle, in which the 60 ounces of water is first placed. This water may be used quite warm if the printer is in a hurry, as the chloride will be dissolved more readily.

The gelatin to be dissolved is placed in a small evaporating-dish, and a small quantity of water (about four ounces) is taken from the sixty ounces in the bottle, and added to it.

The dish is placed on a hot stove, and the water is heated to a boiling state. When this gelatin is dissolved add the liquid to the bottle containing the dissolved chloride, and stir very thoroughly, either with a clean glass rod or by repeated shakings of the bottle. Filter the solution, when it has cooled, through a couple of thicknesses of good filtering-paper into another wide-mouth bottle. Al-

ways keep the bottle covered with a clean glass when not in use, whether it has the solution in it or not.

This solution should always be filtered again immediately after use.

When ready to salt the paper we obtain a suitable size dish—a half-size porcelain dish will do—and thoroughly *clean* and *rinse* it.

Pour the solution in the dish, and if there are any bubbles formed in doing so, break them.

The paper can either be floated upon or drawn through the solution.

If floated, examine the paper thoroughly, and float the side that has the *finest* grain. As the dish is a half-size one the paper will have to be floated in half sheets; but when floating is adopted, a whole-size dish had best be used. Float ten seconds.

If you prefer to draw the paper through, which is the way most generally recommended and followed out, then place the dish containing the solution in the middle of the room firmly set upon a stool, and where there will be plenty of elbow room.

Take the paper by the two opposite corners, place it behind the further side of the dish, and permit it to hang suspended there.

Now draw the paper *slowly* over the side of the dish, curving and diving the side which you have held of beneath the surface of the solution. *Do not pause*, but continue drawing the paper over the side of the dish and under the surface, being careful that you wet all parts of it, and then hold the sheet over the dish by the same corners which were taken hold of in the first place, and allow the solution to drain from the sheet into the dish.

The most important part of this simple process is to get the paper under the solution at first in drawing it through, and to do this we have recommended the use of sixty ounces of solution in the dish (a hundred would be better still), as the paper can be drawn under better than it could with a less quantity. When drained the paper should be hung up by the two corners in a warm room to dry. *Do not hang up to dry, plain salted and sensitized paper by the same pins.*

The air should be absolutely free from all dust in the drying-room while the paper is drying. This solution can be used repeatedly; the bubbles should be removed from the solution every time they appear. These bubbles are caused principally by the dripping of the solution into the dish, when the sheet of freshly salted paper is suspended over it. The forming of these bubbles can, in a great measure, be avoided if the sheet had its lower corner in the dish, and besides draining as well as before, there will not be any drops that will fall any distance from the sheet, so as to occasion the bubbles.

If after salting, and while the paper is draining, there should be

seen any bubbles on the paper, blow at them, and break them as soon as possible. After you are through using the solution pour it back in a bottle, and filter it into its former receptacle.

Clean thoroughly the dish, and set it away, bottom side up, on some clean paper.

Such is our mode of salting, which we always find productive of excellent results.

CHAPTER II.

POSITIVE BATHS FOR PLAIN SALTED PAPER.

THE paper when salted and dried is ready to be sensitized. A different bath is most generally used for the plain paper, as will be explained further on.

A plain bath of nitrate of silver, forty grains strong to the ounce of water, can be used ; such a bath being very strongly recommended by many of our first-class photographers as the very best for plain paper use. It is most assuredly excellent. For plain paper a plain nitrate of silver bath—30 grains of nitrate of silver, water 1 ounce—is the best.

Then, again, the ammonio-nitrate bath is very often used. It is made as follows :

Make up 60 ounces of solution of nitrate of silver so that it will be 40 grains strong of the silver to the ounce of water. Take two-thirds of this solution (40 ounces), and add aqua ammonia to it until it has become clear after it has once become muddy. While adding this ammonia, add a few drops of it at a time, stirring well after each addition. Now add the remaining one-third to the two-thirds, stir well, and filter before use.

When the paper does not foul the solution the albumen silver-bath is used by a very great many photographers, and it is floated upon it in the same way as the albumen paper. Although it does not seem to hurt the bath for albumen paper in some cases, yet the plain paper undoubtedly discolours the bath quicker and deeper, and is likely in time to get many impurities in it that will after awhile hurt the albumen paper. For this reason we have always been in favor of a different solution for the plain paper, and always use such, whether we float or swab our paper, as then if we should prefer at any time to float our paper we can do so. We should advise the

beginner to use a different bath for the plain paper until he had experience enough to observe the effects of floating plain paper on the albumen paper bath.

The care of this bath is the same as it is in the case of the albumen paper bath. (See Chapter I, Part I.)

CHAPTER III.

SILVERING PLAIN SALTED PAPER.

THERE are two ways of silvering the paper, which are about equally in favor. The first of these, floating, we will here mention.

This floating is done in the same way as the floating of the albumen paper, and, as is the case with the latter, there is also a certain side of the paper that is to be floated on the solution.

This side is the *finest* grained side of the two, and to determine which is the one, take the paper over to the light, and by comparing closely the two it can easily be told. The reason why the finest side is used is because the resulting print will be finer, and then again commercial salted paper is often salted only on this side. The time the paper is to be floated is easily learned by observing the results of differently timed pieces of the same sheet of paper.

It is a good plan for the beginner to cut a sheet of plain salted paper into four equal parts, *i. e.*, quarter it, and mark on the back of one fifteen seconds, and on the others respectively twenty-five seconds, thirty-five seconds, and forty-five seconds, and float them separately for the *exact* time designated on the back of each. Commence to time each one of these pieces when the paper has thoroughly become flattened after it was breathed upon to prevent it from curling over. Dry thoroughly, and fume them all the same length of time, not less than eight or ten minutes. If the ammonio-nitrate bath is used, far less fuming is required.

Print in the same quality of light, under the same negative, and to the same depth. Compare the result, and float the rest of the paper for the time specified on the back of the print which gave the best result of the four pieces.

The above is probably the best way for the beginner to learn, and after he has once learned it, he can in the future tell very nearly

how long the paper should be floated, making allowance for the quality of the negatives, temperature, light, &c., &c.

In judging of the quality of the printed plain paper, so as to decide which is the best, there are a few things which we will mention, that will, we think, guide the beginner a little.

If the negative is a fair one (which is about the one you should use in trying the paper), and the resulting print is "mealy"—which mealiness consists in the presence of spots of various sizes, and also of a flat reddish color—then the time of silvering is evidently not what we desire. These spots show more plainly in the shadows and draperies. If the resulting print is as just described, then the paper has not been floated long enough. This mealiness can be very distinctly seen by holding the print between you and the light. The back of such paper remains as white as it was before it was sensitized, never being discolored while printing on account of the heat, but only on account of its being improperly exposed to the light.

Then again, if the paper is silvered or floated for too long a time, it will not have the reddish spots in the shadows, &c., neither will it be *white on the back* (for the heat of the sun will discolor it), but the paper will have a smutty appearance, as though the back of the prints had been exposed for a few seconds to the strong diffused light, and thus discolored. Now examine the face of the two prints once more, and you will observe that the long-silvered paper will have a *sunken-in* appearance. This sunken-in appearance will, in a great measure, disappear in the final operations of the printer, but that is not the object, for the object is to get it so that it will be *all right when it is just printed, and before it is toned*.

We do not mean to say, however, that the above-specified difference of time given for floating different pieces of the same sheet of paper will give all of the above-given results, for in the case of long floating, which gives the appearance of the sunken-in print, the paper will have to be floated a minute or so to give this result.

The writer remembers one time of having occasion to use some plain paper in a strange gallery. As he had to use the paper that day, and being very busy with his other prints, he did not have the time to salt some for use, and upon finding some plain paper (which was not marked) he thought that he would use that, after having applied his tongue to the corner, and knowing that it had been salted. There were only two sheets of the paper on hand, and as he wished a full sheet, and being in a hurry, he did not wish to silver it either too long or too short a time, but as he suspected it was some of Clemons's, he thought that he would float it twenty seconds, especially after having asked the employer about how long he thought Mr. S., the

former printer, had silvered his plain paper, and although he could not tell for certain, yet he thought that it was about that time. He floated it twenty seconds, and after having fumed it, he placed it out to print, and upon looking at it next time he found that the print presented a funny appearance, familiar to the experienced printer, but to the beginner it may not be so (Fig. 42).

The paper printed in spots, *i. e.*, some parts of it would print, and then again some parts had not shown the least signs of printing. Each of these dark and white spots were about the size of a pea.

I floated the other sheet full thirty-five seconds, and I had the satisfaction of knowing that I had as finely printing plain paper as I ever saw.

Plain paper, when floated too long a time, will turn yellow in a short time, as for instance remaining over night, even in the month of October.

Paper floated just right will keep two or even three days in excellent condition, even if the month is that of October.

The other way to sensitize plain salted paper is that which is known by the name of "swabbing the paper."

Paper which is sensitized in this way turns yellow very quickly, so very much so that it is necessary in summer to delay silvering it until you will have time to print it up immediately, *i. e.*, as soon as it is dried and fumed, as letting it remain for two or three hours before use will often discolor it like unto saffron. This can in a measure be avoided by placing the dark-box containing it in as cool a place as possible. The silver solution is more absorbed by the paper by this mode of treatment than by floating, and consequently the heat affects it more.

The swab is made as follows: Obtain a piece of wood about four inches long, one inch wide, and one inch in thickness. Take two or three square pieces of canton flannel, size 4 x 4 inches, and cover this block with it, having the napped side of the flannel out. This will give a soft cushion to rub the paper with. (Examine Figs. 43 and 44.)

FIG. 43.

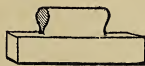
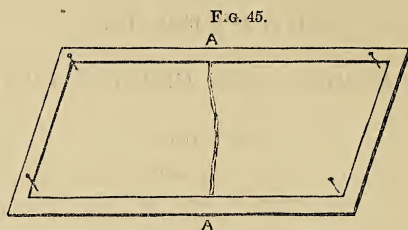


FIG. 44.



To prevent the stringy fibre from being left on the paper while sensitizing it, I am in the habit of snapping well each piece of the flannel before fastening it to the block, to get rid of the loose cotton.

FIG. 45. The fine side of the paper is placed uppermost on a suitable size board; this board is covered with clean white blotting-



paper, which presents a clean surface to the back of the paper. This board only needs to be an inch or two longer and wider than the sheet of paper, and when not in use it can be used as a covering for the whole-size silvering-dish, in which the printing-bath is kept during the day.

The plain paper should be tacked to the board by *galvanized iron* tacks, and not with the common carpet tacks, for the silver touching them will invariably cause a stain across the paper, running from the corner where the silver has touched the tack.

About a couple of ounces of the silver solution is filtered in a small vial, and this vial is taken in the left hand, and the swab fixed conveniently in the right.

Now pour a small stream of the solution across the width, from A to A (Fig. 45), and immediately attack it with the swab, and distribute evenly the solution over all parts of the paper until it has taken the liquid up.

By drawing the swab evenly from left to right, and then from right to left, coming at times nearer, and then proceeding from you, you will thus distribute it equally over the surface. In the pouring on of the solution, try to regulate the quantity of liquid so that just enough will be poured on at one time; a half ounce being about what is needed.

Fresh canton flannel should be used every day, but the flannel used in the morning will answer for the rest of the day's use. Canton flannel that has been used repeatedly is bad.

CHAPTER IV.

DRYING, FUMING, AND CUTTING THE PAPER.

DRYING.

THE paper, after it is floated or swabbed, as the case may be, is then hung up in a small room, by two of the corners, to dry. This room is generally heated by a small gas stove, a small jet of gas doing the work in a very short time.

To prevent the paper from curling up while drying, a stick having a spring clip nailed at each end is fastened to the two lower corners of the paper.

To save the few drops of silver solution which fall from the paper, lay some sheets of bibulous paper on the floor directly under each sheet.

FUMING.

When thoroughly dried, the paper is ready to be fumed. The time of fuming is generally from ten to fifteen minutes.

In fuming plain paper, fume it long enough to print blue, and neither red nor brown, as it will print stronger by so doing. In fuming plain paper a much less time is required to reach this blue state than is the case with albumen paper.

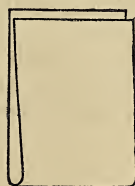
CUTTING.

It is very seldom that any pieces smaller than a 4-4 is cut, as the ordinary 4-4 copy is generally the smallest ink-print that is made. An ordinary ivory paper-cutter can be used for this purpose. In

FIG. 46.



FIG. 47.



cutting the paper take the sheet and lay the length before you in the drawer, the width thus running from left to right.

FIG. 46. Now bend the paper over to A, and crease it at B, and

then cut the paper at this crease with the ivory knife. Divide the remaining two-thirds *equally*, and then the length of each of the three narrow strips is divided into two equal pieces, and thus you will have six 4-4's of an equal size, which will be plenty large enough for the desired purpose.

When I wish to obtain the next size, 10 x 12, I take a quarter of a whole sheet of the plain paper.

FIG. 47. To obtain the next size, 11 x 14, I lay the length of the sheet before me, as I do in obtaining 4-4's, and bend over the sheet until the edge of the paper which was nearest to me comes within about three-quarters of an inch of its opposite side.

The largest of these two pieces I use for the 11 x 14, as there will be plenty of room by so doing to guard against the paper being a little too narrow when the mat is placed over it.

When I desire 14 x 17 pieces I bend over as in 4-4's, and take the two-thirds of the sheet. For anything larger I use the whole sheet.

Always, when about to cut your paper, be sure that your hands, as well as shears and ivory paper-cutter, are thoroughly free from grease, or anything that will discolor the paper.

Keep the paper in a dark and cool place before and after cutting, and while cutting it do not let any white light fall upon it.

CHAPTER V.

TREATMENT OF THE NEGATIVES BEFORE PRINTING.

It is my object here in this chapter to give the cases in which a day's batch of negatives should be "doctored" before they are ready to have their orders printed from them. In the first part of this book I have treated of similar things to the negatives that are to have albumen prints printed from them, but those negatives are as far superior to those of the copies, as the palace of the rich man is to that of the miserable hut of the pauper. In the former chapter I have treated of negatives taken from life, the most of which are vastly superior to the majority of copies that are to be printed, consequently more pains are to be taken with the copies than with the life negatives if the printers desire to have the result as fine as possible.

It is often thought by the printers, even those who have printed

for years, that in plain-paper printing there is no trouble whatever, as they have got to be worked up by the finisher, and as they are copies the result will be as good as the customers have a right to expect. That person is on the wrong track.

There are a multitude of things to be done in printing copies which are often very troublesome. Unfortunately in many galleries the photographer is not paid as he should be to obtain the best results from the copies, when the *time alone which should be occupied* by the printer and ink-worker will come to about what he asks for his work, and then where is the profit to come from for his and his assistant's time ?

Now the better the prints the printer obtains from his negatives, the better will the result be when worked up, because then the finisher's work can be better done.

Let us suppose that two printers have each a plain-paper print to print from the same negative, each one not being permitted to see the print of the other until they are ready to be toned.

One of these printers takes up the negative, looks through it, touches out the pinholes, if there are any, and prints it; under the negative a piece of paper is placed, without any special notice having been given to it, to see as to whether it is excellent or not; his print is printed and placed away until toning-time.

This printer passes the negative to the other printer, who also looks through it, and touches out the pinholes which the former printer of the negative removed when he was through with it.

But *this printer* does not stop here; he observes the heavy shadows which will print black without any detail whatever (making it an impossible task for the finisher to finish them up as they should be), and proceeds to remove them in a measure; *i. e.*, he lightens them, so that they will not be so dark as they would be if this was not done, and consequently better results are obtainable by the artist. He notices then that the face, hands, and arms are flat, and the last-mentioned limbs are also *very dark*. *He cures this flatness* in a measure, and makes the hands and arms *white*. Besides the above, he notices that other parts of the negatives can be improved, and he proceeds to do it.

Examine the two prints: what a difference there will be between the two; but let us not stop here, but have them toned, &c., and finished up by the same artist, having previously marked the names of the printers on the back of the mounts of their respective prints. Now compare the two !

In one print the shadows, especially those under the eyebrows and chin, are very black, without the least signs of detail, looking

very much like a smutch of lampblack, and the face, in spite of all the efforts of the finisher, is flat, while the hands and arms are hideously black.

The other print *is exactly the reverse*; the shadows are as they should be, the face is bold (in comparison), the hands and arms look like the hands and arms of a *white person* rather than those of a *darkey*, as the other print would lead us to take the picture to be, and in fact this whole print is very much better than the other.

The better the print is, the better result can be obtained by the finishing artist.

Having given the beginner an idea as to the importance of printing from copy negatives, I will pass on, and tell what is to be "doctored," and how it should be done.

SHADOWS.

We will first consider the heavy shadows in these negatives.

It is known by all photographers that such shadows, if there are any, are generally very heavy, and they should always be removed in a great measure.

(I will here mention that the beginner should always be on his guard in "doctoring" the negatives, so that he will not overdo it.)

These shadows are found more or less under the eyebrows, and often in the forehead, which latter place will look like a deep depression there.

They are also found sometimes under the eyes, in the cheeks, and a whole side of the face often being very black. They are also found very slightly under the nose, and under the chin—the latter place being the place where the heaviest shadows are generally found. Such shadows are also found in the receding ear (the whole ear sometimes being very black), also on the hands and arms.

They may be removed by the use of the "everlasting blue-paint dodge," which has been so very often spoken of in the first part of this book.

HEAVY LINES.

There are often heavy lines in the forehead, running parallel to each other, and parallel to the line of the eyes. There are also some few between the eyes, running far into the forehead, and crossing the others.

There are also some found running from both sides of the nose to the corners of the mouth, and in the case of elderly persons from that place (the mouth) to the lower parts of the chin. There are lines oftentimes in the neck, especially so when the neck is bony,

caused by the head being turned away from the body in a forced and stiff position.

The way to get rid of such is to take the negative to the retoucher and get him to remove (or do it yourself) the greater part of them. Be careful not to overdo this, but leave something, *in fact considerable*, for the finisher to work at.

The face and sometimes the hands and arms have lines in them which have not been mentioned, as in the latter case, dark lines caused by large veins, and consequently other places, besides what I have named above, should be sought after, and attended to.

FLATNESS.

This is the most difficult of all, and very often the finisher had rather have the printer let it alone than for him to attempt to prevent flatness, and make a botch of it. This flatness is often found in the whole face, and in the hands and arms.

When you desire to prevent this flatness take it to the retouching-frame and work up those places which you desire to be lighter, and place a high-light on the nose to make it stand out from the face.

To prevent flatness to the face, see page 52.

Often a thin stripe of blue paint along the upper part of and along the length of the arms is excellent. Print such negatives under tissue-paper.

I have known cases in which the width of the mouth is desired to be less; then touch out with opaque (or better still with a nearly opaque color, a heavy application of vermilion red answering well), an *equal space* on each side, unless one side above may be curved, being a one-sided smirk, and if that is the case only apply the color on that side. This color may sometimes be applied to the back, and sometimes to the face of the negative, as may be found best.

If the lips are too thick take off a portion of them (*i. e.*, if the parties leaving the copies request the photographer to do it; in fact any of the things that I have above, or shall below name, that depart from the original in *respect to likeness* should *never* be done unless orders have been given to that effect). If this is taken off well, then the finisher will have an easy task of making the lips thinner, by making the curves nearer together. The light places left can be worked up to obtain the same tone as the rest of the surrounding flesh.

Sometimes there are cases when a hat or bonnet is to be taken off, and when that is so, you will find heavy shadows in the forehead; look out for them.

When there is a hat to be taken off, then print a proof of the neg-

ative as it is ; cut in exactly close to the figure, and when you have got to the top of the forehead, and where the hat commences, *cut right close, but under the hat*. Use the cut-out (the outside one) for placing on the *back* of the negative (so that the thickness of the glass will prevent it from printing a sharp line on the print when it is placed under a diffused light), being careful that you get it on as it should be, which, if you do well, the resulting print will be minus the hat, also the upper part of the head ; but the finisher will supply the deficiency with his brush. It would be a good thing if you were to feather it off gradually.

CHAPTER VI.

PRINTING-IN FALSE BACKGROUNDS.

THIS is a well-known and valuable dodge among photographic printers. It is worked as follows :

First print a proof of the negative as it is, said proof being printed on a piece of paper full as large as the desired size of the finished print.

When printed, lay the proof on a glass, printed side up, and with a very sharp knife follow the figure *exactly* on the margin of both the face and draperies. Not the *least possible variation* should be made, or the resulting print will surely show it. No carelessness will answer at all here ; in fact, every particle of the printer's attention should be given to his work, from the beginning of the cutting until he is through. Follow the nooks and turns of the draperies and hair, cutting out each curl faithfully. *Avoid all sharp angles, and let all of the cutting be in curves when corners are turned, and more or less wavering when following the line of the hair*. Particular attention should be given when cutting in around the face and neck ; this is especially the case in the cutting out around the cheekbones. If the printer thinks he can improve on the cutting out if he were to cut another print, then print another one and do so. After awhile the beginner will succeed splendidly.

After the background is cut out, the next process is the pasting it on the *back* of the glass, which process is one of extreme care.

Do not in pasting it on apply paste to the whole print, but to the two upper corners of the back part (*i. e.*, the glass side) of the negative.

It is often placed on the varnished side of the negative, but this, unless done by a person of considerable experience, is very risky, as failure will be certain for the beginner, for it is often so with the experienced printer. When it is desired to place the cut-out on the varnished side of the negative, then in printing in the background the mask is placed close to the paper instead of being placed on the outside of an intervening glass, as described below. I have obtained fine results in the above way, but as it is much more difficult than the way I have partly given, I very seldom do it.

When about to paste the background on the back of the negative, turn over the corners of the paper, which are to touch the corners of the negative where the paste is placed, as the neglect of it will occasion some little trouble when adjusting the print to the negative.

When it is desired to adjust it, rest the negative on a window-sill and look through it to the light, and then the printer can more easily and surely do what he wishes.

When adjusting, keep the paper smooth, and when properly placed, turn down the corners and press them in close contact with the paste. Dry *under pressure*, in the sunlight or by the fire, so that the paper will not contract out of place while drying, which it would be likely to do if proper means were not taken to prevent it from doing so. When dry, place it out to print, either plain or in a vignette style, as ordered (after having placed the sensitive paper under the negative), and print in a strong diffused light.

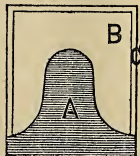
If the print is too long printing, the thickness of the glass and the slowness of the printing will cause the negative to print out too far under the masked background. When in the making of the mask the printer were to think that such will be the result, then make allowance for the thickness of the negative, and for the weather, and then, when necessary, cut a trifle inside of the hair and such other dark places that will print quickly, and consequently feather or blend out beyond the figure on to the background.

Do not touch the face, however.

If the printer were to cut a trifle inside, as written above, then it will feather out softly to just about the right distance and not print in any of the background.

FIG. 48. Now take a suitable size glass, fully as large as the finished print is to be, and lay it on the print, and then paste the mask (the figure which was cut out of the background mask), by applying a dot of the paste at one place on the *outside* of the glass, thus having the thickness of the glass between the mask and the print.

FIG. 48.



Place the print on a flat printing-board, and match the cut-out attached to the glass to the print, and then place it out to print in a strong diffused light if the picture is to be plain, but if it is to be a vignette, then place the vignette-block over the whole, being careful not to move the glass. Place a tissue-paper over the vignette-block, and then place frame and all out face to the sunlight.

If the background is to be a plain one, print either darker or lighter than the *face* of the figure.

If the figure is to have a vignette background, then in the majority of cases have it light, and also have a soft halo to it.

CHAPTER VII.

GENERAL PLAIN PAPER PRINTING.

PLAIN paper prints are generally made so that, by the aid of the finisher, fine results can be obtained from poor negatives.

We seldom make, for the above reason, plain paper prints from life negatives, but from copy negatives, *i. e.*, negatives taken of other pictures, either from the poor ferretotype or the excellent daguerreotype, and which when enlarged from the size of the picture to be copied, all of the roughness and defects on the picture are also enlarged in the same proportion as the portrait itself is, hence these defects are very ruinous to the fineness of the finished print, rendering them in many cases totally unfit for any kind of printing that cannot be worked up, and although considerable work on albumen paper, in the way of coloring with water colors, is done, yet by far the greater proportion of the work is done on plain paper and worked up in India-ink.

It is, however, indispensable with a good copyist to take measures to prevent as far as possible these defects from showing, and the rolling of the prints, the cleansing of them with encaustic paste containing Marseilles soap, placing the print (a photograph in this case) when wet between two pieces of glass and copying it immediately before it dries, and a number of other ways are adapted to bring about the same result. Sometimes, however, life negatives are printed on plain paper and worked up. When done nicely the result is splendid, as there are no such defects to contend with as there are in a copy negative.

I give the following formulæ, &c., for a ready reference for the beginner :

Plain unsalted paper is purchased, and the fine side is floated on for ten seconds, or the whole sheet is drawn through the following

SALTING SOLUTION.

Pure Rain-water, ...	60 ounces.
Chloride of Ammonium, ...	360 grains.
Gelatin, ...	120 "

THE POSITIVE BATH FOR PLAIN PAPER

Is either a plain bath of 30 to 40 grains strong of nitrate of silver to the ounce of pure water, the albumen paper bath (which had better not be used), or another bath known by the name of "Ammonio-nitrate Bath." (See Part II, Chapter II.)

SILVERING PLAIN PAPER.

This is done either by placing the sheet on a solution called the printing bath or by swabbing. If floating is preferred, then twenty-five to thirty seconds on a bath of thirty grains strong is about right for summer, and thirty-five to forty seconds on a bath of forty-five grains strong is best for winter. In swabbing the paper, pour on to the fine side of it about half an ounce of the solution, and distribute it equally over the surface by means of the swab.

"DOCTORING" THE NEGATIVES BEFORE PRINTING.

Look out for heavy shadows, heavy lines, and also look to see if you can improve the looks of the forehead, cheeks, nose, chin, ears, hand and arms, flat faces, &c., &c.

The remedy is generally, *i. e.* to myself, either the blue paint dodge, Irish process, or the retouching pencil.

Make it your business to study every negative that falls into your hands for you to print from.

CHAPTER VIII.

FURTHER TREATMENT OF THE PRINTS AFTER PRINTING.

THE plain paper prints when printed are then to go through the same operations as the albumen prints.

In the first place the edges of the prints are trimmed so that they will not be so likely to tear in the water.

After the albumen prints are *toned*, the plain prints are washed by hand—which can be accomplished in three minutes—and then toned immediately. The strength and looks of the plain paper prints are hurt considerably if they are permitted to pass through the same treatment for so long a time as the albumen prints are, and for this reason they should never be placed in the acidulated water unless the quantity of the acid in it is very small, as it flattens the prints fearfully.

The prints should not be “washed to death” before they are toned, which they would be if they were to be subjected to the same time of washing as the albumen photographs are. The horny surface of the albumen prints is different from the soft and spongy surface of the plain, and whereas it may take fifteen minutes for the washing and acidifying solution to do its work on the hard surface of the albumen paper, three minutes would be ample time for the plain paper.

In the first water for the plain paper prints, about a dozen drops (no more) of acetic acid No. 8 may be placed, but after the prints have been in there two minutes, remove and rinse them well from the acid water, and then they are ready to be toned.

The prints are toned slowly, so that the action of the gold on them will not be so rapid as to cause them to show weakness, which they will surely do if the toning is rapid and forced.

To do this, they are generally toned after the bath has toned the albumen prints, and is wellnigh exhausted.

The albumen paper toning-bath can be used for the plain prints, whether made up every night fresh or not, without any hurt to either the bath or the prints. They should also be toned *face up* in the bath, as stronger prints are obtained by so doing than if they were toned with the face down in the solution.

When the prints are toned *blue*, rinse the toning solution from them, and then they are ready to be fixed in the ordinary fixing-bath.

Fix ten minutes, keeping the prints in constant motion during that time, and then weaken the bath three times, thus making it finally like unto the density of water. The albumen and plain paper prints can be all fixed in the same bath.

The washing of the plain prints can be done in a much shorter time than the albumen ones, and if the printer can, he had better remove them from the bath of fresh water when they have been washed

thoroughly : say four or five hours in continually changing water will be plenty of time.

The prints are then mounted on No. 1 extra cardboard, and when dry they are rolled once under an ordinary roller, and under slight pressure. Never think of using the burnisher for plain paper prints.

The prints are now ready for the india-ink artist.

CHAPTER IX.

CAUSES OF FAILURES IN ALBUMEN AND PLAIN PAPER PRINTING.

IN this chapter we shall give the causes and the remedies of the failures that are constantly occurring, both in albumen and plain paper printing.

ALBUMEN PAPER.

There is considerable fault found with some of the albumen paper which is in a great measure unnecessary.

Now there is no paper manufactured and successfully worked by a *few* photographic printers but that can be worked by a *great many* if they were to try to work it, and not discard it if the first (trial) sheet should not happen to work as it might be wished by the printer. If a paper is worked successfully by some photographic printers, why should we not endeavor also to work it successfully ?

It may be a source of some trouble, and also at the expense of considerable time, to do so, but do it we should, if only for our own satisfaction.

There is no necessity for sensitizing the very first thing, six, eight, or a dozen sheets of paper the working of which the printer is unfamiliar with, and then, because it is sensitized, to print and tone it all up, saying for an excuse that we cannot afford to lose so much paper.

Do not keep on printing day after day, when the paper is working badly, *but stop off short*, even if the best part of a day is wasted, and work *constantly* in every way and manner until you are through with your difficulty, and then your work will again be excellent.

Unfortunately the printer seldom has the say about such things (which he should have if he is capable), and the photographer for-

bids his doing any such thing on account of the time wasted (as he terms it), and "the orders promised to-morrow," &c., &c. The customers probably had rather wait a day or so, if their photographs would be any better, but there is an old saying, "Where there's a will, there's a way," which I always bring home to myself, when I feel inclined to invent excuses for such things.

There are some faults, however, with the albumen papers, which rightfully give them the name of poor paper, and such I will here give.

UNEVEN ALBUMENIZING.

This unevenness in the albumenizing of the paper can readily be seen by examining the paper, and noticing how much thicker the albumen is on one side of the sheet than it is on the other.

This unevenness will sometimes affect the resulting prints of the same negative printed on different parts of the same sheet of paper, some of the paper being much more brilliant than others, which is accounted for on the ground of the albumen being thicker on the paper on which the more brilliant prints were made.

PAPER REPELLING THE BATH SOLUTION.

The albumen on the paper is too dry and horny. Let it remain in a damp and rather cool place over night, and be sure and float the paper when it is damp, and not let it remain in a warm room before floating, if it is only for a few minutes, as it will immediately become horny again.

TEAR-DROPS.

These are caused by the same reason, and in fact are often the result of the above. The tear-drops accumulate in spots over the paper, and when the rest of the paper is dry these spots will not be so. To avoid it in future, have your paper damp and the bath not too strong, and to save the paper on which these spots already have appeared, blot the superfluous part of the solution with blotting-paper. Drawing the paper over a glass rod will often cure it.

ALBUMEN SPOTS AND STREAKS.

These are caused by carelessness in albumenizing; the spots by albumen spattering on the paper, the streaks by the albumen running zigzag when the paper is hung over a line to dry.

These streaks are generally in the middle of the sheet, and run either in the direction of its length or width, and very often diagonally.

METALLIC SPOTS.

These are found in almost all of the albumen papers that I have used, and owing to the partiality which the Rives paper has for it the Saxe paper is very much preferred by many photographers, as there is none found in that particular paper. It is occasioned in various ways; often in the drying of the freshly albumenized paper. When so caused it is owing to clouds of iron-dust, which are set in motion by draughts, &c., which settle on the paper, as before said, while drying. The (iron) dust generally occurs from the iron rust on the stoves, which are used in keeping the rooms hot for the purpose of drying the paper, or from the machinery.

Metallic spots occur also from some local cause in the printing-room, probably while drying, after it is *sensitized* on the printing-bath. The gas-stove, which has become rusty (varnish it all over when it is so) either from drops of water which have been carelessly spilt on it, or from dampness of the air, detaches some particles of it in the air by the draughts, which are numerous as soon as the stove is lighted, and settling on the paper while wet with silver will cause a very decided metallic-looking spot or stain on the paper, and which appears to be more of a stain caused by the iron-rust coming in contact with the silver than it does like a piece of iron-rust, and as a very small speck of dust of this nature will cause a large stain, we are led to believe that the metallic spots are developed or decomposed on the paper, and thus if there should only be a small cloud of dust of this kind in the air it would finally be productive of disastrous results.

This kind of dust is easily told from that which occurs in the manufacturing of the plain unalbumenized paper, or in the albumenizing of the plain paper, by picking out a few of these metallic spots with a needle, and then if the spots have accumulated in the manufacture of the plain paper they will then be found deeply imbedded in the paper and beneath the surface of the albumen, and from the appearance of the dug-out place I am led to believe that small particles of machinery, which are at times flying through the air, imbed themselves in the paper, and thus occasion the smutty appearance of the holes which have been left when the metallic spots are dug out.

If they occurred in the albumenizing they will be superficial, and before the paper is silvered will be very faint in appearance, but after it is silvered they will be brought more fully out.

When the dust has got on the paper, when freshly sensitized, it will have a freshness and brightness that will readily tell the examiner when it got there.

FAILURES IN PREPARING PLAIN PAPER FOR PRINTING.

Good paper for plain paper printing can be had by using the back of albumen paper, as the salt which is mixed with the albumen in the albumenizing of the paper will, in conjunction with the albumen, make a strong print without any necessity for any more salting. I have obtained fair results by the use of the above, but have used paper prepared as given in a former chapter with greater success, but in case of emergency the other way will answer.

Anderson recommends for salting, a solution of five grains of chloride of ammonium to the ounce of water. He says nothing about the use of gelatin in the solution, but I find that the prints are much better if a couple of grains or so of the gelatin are added to every ounce of water. An india-ink artist also informs me that the paper works better with it than without it.

If the plain prints have a sunk-in appearance (and you are certain that it has that appearance), then the salt is used in too large a quantity in the salting.

If they are flat and mean-looking prints, then the reverse is the cause.

If the plain paper prints are coarse, you have used the wrong side in sensitizing, and if that is not the case, then you used the wrong side in floating on the salting solution.

If the coarseness appeared after the final finishing (*i. e.*, after it has been mounted and before it has been worked up), then the paper has been subjected to too harsh alkalis, probably in the toning bath.

If you cannot get a print on plain paper, *i. e.*, no signs of decent printing, probably the paper has not been salted. To determine if a paper is salted taste of a corner, and if it taste saline then it has been; if it does not, then the reverse. If there are transparent spots all over the plain paper, you have probably handled it with greasy fingers. These disappear when finished.

FAILURES WITH THE POSITIVE PRINTING BATH.

These occur both in the making, working, and care of it.

In weighing out the nitrate of silver, or the nitrate of ammonium, &c., &c., always be sure that the scales are clean, and place small pieces of paper on both sides of the scales, of the same size, before weighing out anything, and you will be doubly sure then of perfect cleanliness. Use fresh pieces of paper every time you use the scales.

Never touch your fingers any more than what is absolutely necessary to the contents of your bottles, and when about to weigh out

silver, &c., place a piece of the paper, previously placed in the scales, in your hand, and pour the silver in that.

In weighing out chemicals always be sure that you have reckoned the precise amount of grains, &c., correctly. It would be a good thing to have a table of ounces reduced to grains, and I will here give one for solids, such as nitrate of soda, &c., and also one for fluid measures.

<i>Solids.</i>				<i>Fluids.</i>			
20 Grains	=	1 Scruple	=	20 Grains.	60 Minims . . .	=	1 Fluid drachm.
3 Scruples	=	1 Drachm	=	60 "	8 Drachms . . .	=	1 Ounce.
8 Drachms	=	1 Ounce	=	480 "	16 ounces . . .	=	1 Pint.
12 Ounces	=	1 Pound	=	5760 "	8 Pints . . .	=	1 Gallon.

When about to make up solutions always be sure that the bottles are clean.

In the mixing up of solutions, as per formulæ, if there is a particular way of mixing them given (as I have given in the making of the collodio-chloride in Part III), always mix them in that order.

In the printing department, when pure water is recommended, and distilled is not at hand, then pure filtered rain-water, or clean melted ice, will answer.

In cold weather always warm your silver bath before using, and not float your paper on an ice-cold solution.

Make your bath stronger in cold weather, and also silver longer, than what you do in summer.

In the summer, printers are apt to get their bath too weak in silver ; never let it get below thirty grains strong of pure nitrate of silver to the ounce of water, saying nothing of the other ingredients which are sometimes used in the composition of the bath.

Do not let your solution get too low in quantity, so that you will have to place in a large quantity of the stock at one time, as for the next day or two the bath will not work so well. Always have your stock, or adding solution, made up in the same proportion, as to ingredients, as was used in the first composition of your daily bath.

Always keep your printing bath in the dish covered up when not in use.

Pour your bath back into the bottle every night, clean your dish out, and set it away bottom upwards on a shelf covered with clean paper.

Filter your bath before using it the next day.

When the bath in the silvering dish is dirty always skim it before using again.

When the bath is discolored, which is due to the impurities which has been left in it from floating, &c., always clear up with a little

kaolin, camphor, or permanganate of potash, &c., as has been explained in a former chapter.

Sun the bath when not in use.

Test your bath every morning before use to ascertain both the strength of silver and the degree of alkalinity of the solution.

Be sure that your bath is a little alkaline, but *never acid* (see Chapter I, Part I) unless you are using the citric acid printing bath, and then have it only a little so; but in the case when you are not using such a bath never have the solution acid with *nitric acid*. Better results are obtained with either an *alkaline* or a *neutral* bath than with an *acid* one.

For a weak negative, and one inclined to be flat, a strong bath and a longer time of floating is required than when the opposite is the case.

Better prints are obtained by the addition of alum, or nitrate of ammonium, or both, to the bath solution than what is obtained without them, as they coagulate the albumen, and keep the solution on the surface, making more brilliant prints, and being more easily washed in the final washing.

Boil your bath down two-thirds every month or so, and make up as before.

Use Pile's test-tube and solution for testing your bath, when there is anything in it besides nitrate of silver, as the common hydrometer will mislead you.

When you wish to know the quantity of nitrate of ammonium, or soda, in your bath, and you are sure that the albumen and other impurities are out of it, then test with the hydrometer and with Pile's test (which is the only sure test for the silver), subtract the two, and the difference is *one-half* the number of grains of nitrate of ammonium in the bath.

For instance, suppose you were to make up a silver bath of thirty grains strong to the ounce of water, and wishing nitrate of ammonium in the bath, you also put in thirty grains of this to the ounce. Test with hydrometer, and it will stand at 45 grains. Test with Pile's tube, and you will, of course (for you know in this case, for the bath was just made up, and has not been used), find it this time to stand at 30 grains. Subtract the two; 15 grains is left, which is half of the number of grains which you know was added.

In the case just cited, the rule may not be required, for you know already the strength of the bath, and just how much nitrate of ammonium there is in it, but when a bath has been used for some time the amount of each is not known, then the above may be handy. Before using the above test, however, the printer should endeavor,

as far as lies in his power, to remove all of the organic matter from the bath, so that it will not deceive him.

FAILURES IN SILVERING THE PAPER.

Paper Silvered too Long a Time.—Result: The paper will discolor very quickly, according to temperature, and the prints will have a sunken-in appearance, and with a strong bath bronzing is very plainly indicated (even when the prints are finished) in all of the slight shadows, even those under the eyebrows, the latter result being more evident in the case of the albumen paper, the former (sunken-in appearance), both in plain and albumen paper.

Paper Silvered too Short a Time.—Result: Weak, flat prints, without any boldness, prints red, and red spots of various sizes are very noticeable. The bath is either too weak or the paper is floated too short a time, or both, when the above results appear.

Plain paper, if silvered too short a time, will act similarly to albumen, and then if it had been swabbed when this result occurs, the strength of the silver solution is too low, and should be increased.

Do not lay flat and red prints to the paper being undersilvered, unless you are sure that the paper has been thoroughly dried before and after fuming, as the same results occur by printing upon paper that has not been dried, as said before.

Bubbles on the Paper while Silvering.—Blow at them, or touch them gently with a glass rod.

Paper curling over while Silvering.—Breathe gently (don't blow) on it, and it will flatten at once.

Greasiness to the Solution on the Paper after Floating.—The paper was either too dry before floating, solution too cold, or the paper was floated too short a time.

Uneven Silvering, see Silvering the Albumen Paper, Chapter II, Part I.

Stains on the Paper after Silvering, and while Drying.—Caused by the paper coming into contact with dirty places while you are hanging it up, by dirty hands, and stains running from the corners where the paper is suspended either by common pins, tacks, &c. Remedy: Carefulness in hanging up the paper, and by the use of spring clips.

FAILURES IN DRYING THE PAPER.

Swinging and sticking together of the paper while drying, caused by draughts.

Curling of the paper while drying can be prevented by obtaining a piece of stick as long as the lower side of the suspended paper, and

nailing a spring clip at each end of the stick ; fasten it to the paper by means of the nippers when the solution on the paper has stopped dripping.

Tear-drops in Drying.—Absorb the drops of solution with a piece of bibulous paper, and dry thoroughly.

Place a piece of tissue-paper on the lower corners of the paper while drying.

FAILURES IN FUMING.

Insufficient Fuming.—Result : Prints are red, flat, and weak. The ammonia is not strong enough, or the paper was taken from the box before it ought to have been.

Too much Fuming.—Result : Prints have a disagreeable blue and a cold, repelling (and often metallic) look to them. Remedy : Fume less.

Uneven Fuming.—Result : Part of the paper prints well, and other parts print flat and weak. Caused either by the curling of the paper while fuming, or by parts of the paper being covered with other sheets.

CUTTING THE PAPER FOR PRINTING.

Dirty Paper.—Caused by dirty hands, shears, or by laying the paper in a dirty place.

Paper Cut Badly.—Caused either by carelessness or ignorance.

FAILURES IN PRINTING.

Breaking of Negatives.—Caused either by carelessness, flaws in glass, curved negatives, bad cutting, printing-frames, &c., &c.

Double Features on the Prints.—Caused by the prints moving in examining them during printing.

Harsh Vignettes.—Caused either by a bad wooden vignette-block, the vignetting papers or cardboard being too near the negative, and if none of the above is the cause, then by the vignette not being blended enough for the strength of the light it was printed in. (See Chapters IX and XII, Part I.)

Badly Shaped Vignettes.—Caused by the use of a badly formed vignetting arrangement.

Medallion Printing.—Badly printed crescent lines, &c. Caused by poor cut-outs and masks (*i. e.*, background masks), and often by the wrong use of them, even if they are good. (See Chapter XIII, Part I.)

Fancy Medallion Printing.—Failures in this style of printing are

generally caused by not going to work rightly. (See Chapter XIV, Part I.)

Printing in Gray.—Failures in this style of printing are harsh edges. Caused by shading the figure poorly. (See Chapter XIV, Part I.)

Bendann Backgrounds.—Failures with moving backgrounds, backgrounds printing in the figures, bad taste in choosing the right style of background, &c., &c. (See Chapter XVI, Part I.)

Blurred Prints.—Caused by the paper not being in perfect contact with the negative, and then again it is caused by the paper being too large for the place allotted to it in the frame, by its being damp, &c.

White Spots on the Paper.—Caused by the bubbles being permitted to remain under the paper while it is floating, and by dirt on the negatives.

Unevenly Printed Shadows.—Caused by poor “doctoring” of the negatives, or by printing the negative after it is *doctored* in too strong a light.

Uneven Printing.—Negatives being partly shaded during the printing, and when reference is made to the result of a day’s batch of prints, then a great diversity of the shades of prints are meant; some being too light, and others too dark, &c.

FAILURES IN TRIMMING PRINTS.

I will not here attempt to tell how the failures may be avoided, but only to notice where these failures generally occur, and then the remedy will be obvious.

Head cut too high or too low in the prints, cut too much to one side, prints cut so that the figure appears to be falling either in one direction or another, and when the figure is leaning on a chair or a table, the idea of leaning is not carried out, so that the figure will appear to be sitting up straight, with the arms lying on the table, merely mechanically, without conveying to the understanding of the tasteful critic any successful idea that the photographer intended to have carried out.

When a print is cut as last described, a beautiful pose is often completely spoiled, and it looks to be just exactly the opposite, as regards beauty of pose, to what it is in the negative. The young beginner can thus see how he can completely spoil the beauty of a pose by making it a mechanical, instead of an artistic one.

Besides the above, there are scores and scores of cases in which the prints are a failure when so trimmed.

FAILURES IN WASHING.

Imperfectly Washed Prints.—Caused by the prints lying together in the water ; bad results follow such treatment of the prints.

FAILURES IN ACIDIFYING.

Spotted Prints.—The acid water has either got on the prints before they were placed in the water, or they were separated imperfectly while being placed in the acid water.

Refusing to Red up.—The water is too cold, the acid too weak, or the paper was fumed too long.

Blistering of the Paper.—The water is either too cold or too hot.

FAILURES IN TONING.

Toning Baths.—The failures in the toning bath are in the composition of it, being made up wrong, or having got some foreign substance in it that spoils the fine working of it.

Acid Toning Baths.—These baths will tone if only a little acid, but not so nicely as alkaline toning baths, owing to the acidity of the solution, which bleaches the prints considerably before they are toned, and thus destroys the strength and beauty of them. They also tone very much slower, as the gold is not thrown down on the prints only very slowly, as the acidity of the solution holds it in suspension. That is why we make our stock solution of gold acid, and only neutralize a part of it whenever we commence to tone, for if we were not to do this, the gold of the solution in the stock-bottle would be thrown down, and the solution would then be useless. Toning baths should always be made alkaline before use.

FAILURES IN TONING PRINTS.

When the bath is too strong (*i. e.*, contains too much chloride of gold), the prints tone so rapidly that you cannot stop the toning quickly enough to prevent them from getting overtoned.

Uneven toning is caused by the bath being too strong, prints lying more or less together while in the bath, insufficient moving while toning, and then again by the prints not being washed sufficiently before toning, strengthening the bath while the prints are in it, &c.

Prints showing weakness in the toning bath is owing partly to the bath being too strong, and the prints being more or less weak before they were placed in the bath, and if the latter is the case, then a quick-working bath will increase this weakness.

Prints refusing to tone is due to the solution being too cold, too acid, or there not being enough gold in the solution.

Mechanical Toning.—This is the name given to toning when all prints are toned alike, whether they are portraits, landscapes, machinery, drawings, &c., &c., when certain tones are best suited for each of them. (See Chapter XXIV, Part I.)

FAILURES IN FIXING PRINTS.

If the fixing-bath should be at all acid sulphur will be liberated from the hyposulphite of soda, which will unite with the silver both in the prints and that which is in the solution, forming sulphide of silver, which will eventually be the means of spoiling the prints. To be sure that the bath will never be acid add bicarbonate of soda to every batch of soda-solution you make ; and never use a bath twice, as it will cause the prints to fade, for the very reason that has been spoken of above, and the whites of the prints will discolor and be a white-yellow in color rather than the virgin white.

Uneven Fixing.—This is caused by the prints not being separated thoroughly while in the bath, and the silver consequently not being thoroughly removed.

Air-Bubbles in Fixing.—The bubbles continuing unbroken in the fixing bath often get between the prints, and if they are not kept in constant motion while in the bath these bubbles will cause minute spots of imperfect fixing. These spots are yellow.

If the prints are constantly kept in motion while in the bath about all of the evil effects that have been named above will be avoided.

FAILURES IN WASHING.

Insufficient washing is a source of fading of the prints, making them turn yellow in a short time.

If the prints have not been sufficiently fixed they will show it when washing, as then they will look dark and muddy when examined in a strong light. Keep the prints separated from each other while washing.

FAILURES AFTER THE FINAL WASHING.

Mounting Prints.—Starch, &c., as a source of fading. (See Chapter XXVII, Part I.)

Cards a Source of Fading.—It has been discussed considerably, as to whether the cards upon which the prints are mounted are a source of fading. It has been satisfactorily proved by many of our leading first-class photographers both at home and abroad that it is

very seldom, indeed, that there is anything in the cards that will affect the prints.

Lately (*i. e.*, within a year or so) the manufacturers of the card-mounts have taken more pains to utterly exclude, as far as possible, all such ingredients in the manufacture of the cards that will in any way help to destroy the prints.

Owing to the blame being laid to the card-mounts, as a cause of the prints fading, an eminent firm of Paris, France (MM. Rohaut & Hutinet, manufacturers of card-mounts), made a fair and impartial trial, and laid the result of their experiments and researches before the French Photographic Society, which society was satisfied beyond a doubt that the card-mounts are not a source of fading of the prints, but that when fading does occur it is from other causes, probably improper manipulations of the prints, &c. If the members of this society, who were in the first place prejudiced against the card-mounts, all of whom are excellent photographers, are satisfied with the investigations, we also should be, and I for one am.

Now when we take into consideration that the prints, which we know are properly manipulated, do not fade for months (see experiments, page 126) under severe tests, we cannot help being satisfied that those prints were excellently made, and properly manipulated; and we do not think of such a thing as the card-mounts making them fade, because they do not.

It is only when the prints fade that the mounts are said to be a source of their fading.

I know of a photographer who to my certain knowledge changed his mind no less than *six* times in as many months about the mounts making the prints fade, at one time saying that they did not, because the prints were "all right," and at another that they did, because they were all wrong; but there was one peculiarity in his remarks, and that was that the prints themselves never (?) were the cause of fading, but that it was always the mounts. The reason why, was because the photographer himself did the printing, or at least *I think* that was the reason.

Once upon a time the printers of a certain photographic establishment were to be let off at two P.M. (it was a holiday) providing they got their work done, and as a natural consequence one o'clock came before they were aware of it, and so, of course, they had to "rush things" to get done at two o'clock, and when printers decide on rushing things you may depend upon it that they can do it. They got off at two P.M. of course. A few days afterwards these very prints were spotted, stained, &c., and of course "the boss" wanted to know how they got in that condition, and he asked the foreman-

printer about it, and inquired as to whether that batch of prints that were toned on the last holiday had the usual amount of care and attention given to them that he was in the habit of giving the prints.

The printer, of course, said that they had, and suddenly exclaimed as though the thought had just entered his head :

“Come to think of it, I was very particular about that batch, because, as I started quite early (?) to tone, I had plenty of time to tone them, and as I had a splendid light to tone by I liked to see how nice I could make them come out ! But why do you ask ?” he innocently inquired.

The photographer then told him about the prints, and while telling him about it he happened to think that those prints were mounted upon some new card-mounts which he had received on that day, and being mystified about it he at once laid it to the mounts, and immediately sent them back to the bewildered parties of whom he had purchased them, and as he had no more trouble with his prints he probably thinks to this day that the card-mounts were poor, and most likely he is a strong advocate of the idea that card-mounts are a source of fading.

FAILURES IN FINISHING.

Color mixed badly, absence of gum arabic in the color, prints rolled badly.

Encaustic paste made wrong, daubed-up card-mounts, ridges on the surface of the prints, &c. (See Chapter XXVIII, Part I.)

Part III.

PORCELAIN PRINTING.

CHAPTER I.

SELECTION OF THE PORCELAIN PLATES.

PORCELAIN printing is the most difficult of the three parts described in this book both to the experienced and to the inexperienced printer. I think that if the advice which I will give in the following chapters is faithfully carried out that the difficulty will entirely disappear.

The foundation of porcelain printing depends upon obtaining fine porcelain plates, which is by no means an easy thing to do. A little advice as to the kind of glass the beginner should select will perhaps be of value.

In the first place go to a respectable stockdealer, *one who understands his business*, for none other than such a one would be likely to keep a good stock, especially if he picked out his goods himself.

Do not accept, in the hopes of making a great bargain, porcelain-glass which may be offered to you at a great discount. Beware of such dealers, for you may be certain that the glass is poor, else they could command and get good prices for it. Generally the stock-dealers purchase it in a large quantity and sell it in that way, and then they do not know what class of plates the contents of their packages may contain, but be certain of one thing, they never pay poor prices for good glass, and when they buy cheaply, they know about what they have got. Then again, photographers look over the porcelain glass, and pick out the best plates, when they go after it themselves, but when they send for them they get what is left after the pickings.

There are various sizes of plates which the beginner should provide himself with, and all of these sizes are either ground or polished,

as you may desire to have. The ground plates are intended to be used when the porcelain is to be worked up either in water-colors or in oil; the polished plates more for uncolored work.

The sizes are known as the 11×14 , 8×10 , $6\frac{1}{2} \times 8\frac{1}{2}$, and $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$. The larger of the plates are sometimes "extra thick," although those of ordinary thickness are more used, partly on account of the difficulty of cutting the "extra thick" when necessary, but principally because they are more expensive.

In selecting your plates see that they are flat, and if there is a side that is convex then see if the surface of the glass is smooth, for that is the side of the two which is to be used to print on. If the convex side of the plate is not smooth but rough, as it will be if it is not polished properly, then reject it.

To determine whether the glass is flat or not hold it up before you, and look along the edges of both its length and width. If the plate is a little uneven, and you think that by a little care you can so arrange it on the printing-board that perfect contact will come between the negative and plate, then save it.

Another thing in selecting the plates is to see if they are thick, which is very important, especially for anything larger than a half size, for thin porcelain plates often break from their own weight alone; in fact, always use the best plates—selected as per advice given above—that you can obtain, and one good step towards success will be taken.

CHAPTER II.

CLEANING OF THE PORCELAIN PLATES.

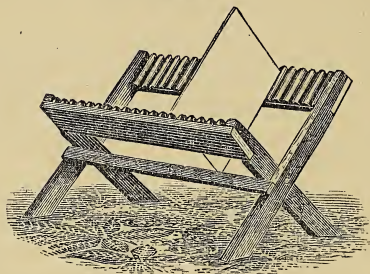
Cleaning New Plates.—Wash the plates thoroughly on both sides under a tap of water, and place them for the time being in a rack (see Fig. 49).

The object of washing them first is to remove all of the dirt which may happen to be on them.

Now, to get the plates "chemically clean," they are placed in a suitable size tray of photographic ware, which contains a solution made of commercial nitric acid one ounce, water four ounces. Let them remain in this acid bath for a day or so, and then they are ready to be removed and washed for albumenizing.

Cleaning Old Plates.—For the purpose of cleaning old dirty plates which have been used before, whether varnished or not, they should first be placed in a bath made of concentrated lye 1 pound, water 1 gallon. Let them remain in this bath until the film will be easily removed by running water, which will probably be in a day or so.

FIG. 49.



When this time has arrived, then wash well under the tap until *all* of the varnish and film is removed, and then place them one by one in the acid bath as described above. Keep the old plates in the lye until all of the film is removed, and never place them in the acid until that time arrives.

In placing the plates in either the lye or acid always place them in, as above said, one by one, so as to allow the solution to pass over one plate before another one is placed on it.

Never place large and small plates in the same solution at the same time, unless *all* of the large plates are at the bottom; for if they are mixed up, first large and then small ones, the weight of the upper plates will cause the unevenly supported plates below to break, and it is also a very difficult thing for the beginner to take them out when so mixed up without breaking a number of them.

It would be a good thing to lap the edges of one plate over another in the solution, as the solution will pass between the plates better.

Both the strength of the lye and acid will need to be renewed every month or so.

Before placing the plates in either the lye or acid solutions scrape the edges of them together, and in the future treatment of them you will most probably derive a benefit, as the collodio-chloride will be more likely to keep on the plate during the toning, fixing, &c.

Ground plates are generally very difficult to clean even if the above advice is strictly followed out, and I very often clean them after they

are removed from the lye and washed, and while still wet, by sprinkling a little powdered emery on that side which is to be used for printing, and grinding the surface evenly by means of a flat side of a cork.

Ground plates which have been purchased, and are unevenly ground, can thus be made excellent by a very little trouble.

When the grinding is finished wash them well under the tap, and place them for a day or so in the acid bath.

CHAPTER III.

ALBUMENIZING THE PORCELAIN PLATES.

THE porcelain plates are now to be albumenized, and for this purpose procure three large fresh country eggs, which you are to crack and carefully let the albumen (the white part) into a large clean china bowl, being careful not to let any of the yolk (the yellow part) of the eggs into it, and if by accident a trifle of it should get in, then remove all traces of it by the use of a spoon.

Pour the albumen into a *clean* graduate, and note the number of ounces of albumen, and add just as many more of *pure* water.

The eggs should average an ounce of pure albumen each. Pour the diluted albumen back into the bowl, and then place in it a dozen drops of strong aqua ammonia, and with an ordinary egg-beater beat the whole up to as stiff a froth as possible. This should be well and carefully done. Let settle over night, covering the bowl over with a glass. In the morning decant the solution, leaving the froth in the bowl, into a clean bottle, or another bowl, and filter what you need into a thoroughly clean four-ounce vial, or better still into a tiny tea-urn, which has a nose leading to the bottom part of the ware, for then in pouring the solution out there will be no bubbles, for they are at the surface if there are any at all.

A good plan, whether you may have the toy tea-urn or not, is to let the lower part of the funnel rest against the inside of the vial (Fig. 50), thus permitting the albumen to run down the side, breaking the fall of the filtered solution, and thus preventing bubbles from being formed.

Filter through one or two thicknesses of good filtering-paper, and if the albumen is not clear, then filter until it is.

Always keep enough ammonia in the solution for it to continually give forth a slight odor.

I have recommended the albumen solution to be

FIG. 50.



used quite thick, as the film on the plate will not be near so likely to be removed in the subsequent operations of the porcelain print, which is so very troublesome both to the beginner and to the "old hand."

The plates are now to be removed, one at a time as they are wanted, from the acid and held up to the light, and the edges of them looked at to determine the convex side of them, if there is any; but if there is not, then choose the best of the two sides, and proceed to wash thoroughly under the tap, rubbing the sides and edges of the glass well with a mat, so that the fingers, which are often a little greasy in spite of your precautions to the contrary, may not come into contact with the face of the porcelain.

Hold the glass while it is washing by the edges, or extreme corners, and when it is sufficiently washed take it out of the dark-room (where you albumenize the plates) to see as to whether it is fit to be albumenized, and if it is then give it a final rinse with filtered rain-water (filtered as it comes from the tap), and then carefully pour the albumen solution on the upper part of the plate, midway between the two corners, and let it flow over the plate, first to the upper left-hand corner, then to the upper right, next to the lower left (which is the corner by which the plate should be held), and finally carefully pour off at the lower right-hand corner into *another* bottle.

Do not pour on but a little more albumen than what will cover the plate, and before using again the small quantity that may have been left after you are through albumenizing, it should be filtered.

Now place the plate which you have albumenized, still holding on at the same corner, either in a rack, or upon two nails (see Fig. 3), to dry, letting the drops fall upon blotting-paper, so that their fall will not raise a cloud of dust. Permit the plates to dry spontaneously.

CHAPTER IV.

MAKING THE PORCELAIN COLLODION.

I WILL below give a formula for the making of the collodio-chloride which I know to be good, having used it for more than two years, and I can truly say that I never knew a batch of this collo-

dion to fail any one who has ever used it, providing it was *properly mixed* in the making of it.

If the porcelain collodion is not carefully mixed and made, it is the most fickle of all collodions.

The purest of chemicals and great care are required, both in the mixing together of the different solutions and in always keeping the collodion when it is made in *absolute darkness*, else it will be worthless, for if it is exposed to the light it will become discolored, and a chemical action is commenced which will, in a short time, render it as worthless as so much dirty water.

For this reason photographers, to guard against the actinic light getting at the contents of the bottle, should not only keep it in a dark place, but wrap printed and untuned paper around it, so that every part of the bottle will be covered, and only a little of the neck will show; and no more of that than what is required for the purpose of pouring the contents out, so as not to have the collodion to touch the paper. The writer generally uses a couple of thicknesses of yellow envelope paper.

Another thing for the beginner to bear in mind is that he should always mix the different solutions, in the making of the collodion-chloride, a *drop or two* at a time, and no more, for then the solutions will be more likely to get mixed together than if you were to pour them in quicker. As a rule, always bear in mind that the slower the solutions are mixed together the longer time will the collodion keep in a good condition.

Then again, always handle the bottle of collodion as gently as possible, so as not to shake the contents any more than is really necessary.

Mix the solutions in the order given below, and *never* otherwise.

When ready to make the collodion, first proceed to make up four solutions, which will be stock, and which will at some future time enable you to make up more collodion in a short time, as you will only have to take a certain quantity of each of the stock solutions and mix them together.

A.—Plain Collodion.

Alcohol, 95°, ...	7 ounces.
Ether, ...	9 ounces.
Gun-cotton, ...	112 grains.

B.—Silver Solution.

Nitrate of Silver, ...	480 grains.
Distilled Water, ...	1 ounce.

C.—*Calcium Solution.*

Chloride of Calcium, ...	128 grains.
Alcohol, 95°, ...	4 ounces.

D.—*Citric Acid Solution.*

Citric Acid, ...	128 grains.
Alcohol, 95°, ...	4 ounces.

Label each of these bottles, and state plainly what the contents of each bottle consists of, and exactly how it was made, in fact, write the whole formula on each label.

Obtain a ten-ounce collodion bottle which is thoroughly clean, and rinse it out with a little ether. Carefully decant 8 ounces of A, after it has been standing for a few days, into this bottle, and next add 64 drops of B, adding but two or three drops at a time, shaking well between each addition to prevent the silver from precipitating.

Now add in the same way 4 drachms of C, adding *two* drops at a time. This last addition is the most important of all, for the moment a drop of this is added, it will commence to turn milky, and chloride of silver is formed. This last addition should be done in the *dark*, and it would be well for the beginner to heed it, *for from this time until the collodion is used up, the bottle should always be kept in the dark.*

Finally, there should be 4 drachms of D added in the same manner as the calcium.

The beginner must bear in mind that chloride of silver is far more sensitive to the light than nitrate of silver, besides giving a softer, finer, and more delicate print than the latter.

It is on this account that the paper which is used in the positive process is salted generally with chloride of ammonium, although chloride of barium is sometimes used, so that we have a paper prepared which, when floated upon a bath of nitrate of silver, the chloride in the paper will take up from the bath the silver which it needs and form chloride of silver, which will print, as before said, much better than nitrate. Now the same thing is the case in the making of the collodio-chloride, with the exception that we cannot prepare the porcelain plate with a chloride as in the case of the paper, neither can we float or swab the plate successfully. To overcome this, we make a collodio(n)-chloride which will in its composition combine all of the nature of the albumen or the plain salted paper and the nitrate bath. The chloride of calcium, in conjunction with the nitrate of silver in the collodion, will form a *chloride of silver*, which is just what we wish. The plain collodion in the

above collodio(n)-chloride is to give a tough body (*when viewed in one direction*) to the solution, which body is increased or diminished according to the number of grains of cotton there may be to the ounce of collodion, and to prevent it from getting thicker than it is already; then keep this plain collodion, as well as the collodio-chloride bottle, tightly corked.

The nitrate of silver in the above solution answers the place of the positive nitrate of silver bath, and the chloride of calcium, which is the chloride I always use, takes the place of the chloride of ammonium in the paper, and the chloride of silver (which is formed by the nitrate of silver and the chloride of calcium uniting) in the collodion is the same as the chloride of silver which is formed in the paper when floated upon the nitrate bath.

To get a richer tone to the freshly *silvered paper*, as well as to coagulate the albumen and prevent the solution from penetrating too far into the paper, alum, nitrate of ammonium (especially the former), are generally used, and to get a richer tone in the *collodio-chloride*, citric acid is used in the quantity recommended above.

In place of using the chloride of calcium, many photographers use the chloride of lithium or strontium, but I have always liked the calcium best, although I cannot say that I have given either of the above (*i. e.*, lithium or strontium) a very fair trial. The chloride of calcium, however, is the most used of the above-named chlorides.

When the collodion is well made, it will have a most delicate pearly whiteness to it, which is the most beautiful color of that kind that I ever saw.

It can be worked with good results in a day after it is made, but it is in fine working order in about a week. I have used it when it has been four months old, and with the exception, in hot weather, of a very slight tinge of yellowness, it has been all right.

If porcelain collodion is made to keep for a long time, the greatest pains should be given in adding the silver and calcium to the collodion so as to have it properly mixed. It should be made more sensitive in winter than in summer, and for the beautiful imitation, the "photo-porcelain," it would be better if the proportion of chloride of silver were six grains instead of eight, as the shadows in the making of this style of picture are more given to bronzing than in the real porcelain, but for the porcelain itself eight grains is the best.

CHAPTER V.

COATING, FUMING, AND DRYING THE PLATES.

COATING.

THE plate, when albumenized, is then to be coated with the collodio-chloride.

For this purpose, take the plate to a room where there is not too much white light, for instance in the "dark-room," when the door is slightly opened. Brush away the dried collodion film and whatever dust there may be around the cork, being careful not to shake the contents of the bottle while doing so.

Hold the plate with the left hand, level to the floor, having hold of the lower left-hand corner, and take up the bottle of collodion in the right, and remove the cork with the teeth, if you have previously neglected to do so.

Pour the collodion at the centre of the upper part of the plate until that half is covered, and then discontinue. Let the collodion flow over to the corners of the plate as I have recommended in Albumenizing the Plate (see Chapter III, Part III), and when the collodion is ready to be poured from the plate, take up *another* collodion bottle (which should be kept expressly for this particular purpose) and let the collodion flow into that.

There is a knack in doing this, which consists in letting the plate lie almost level to the floor until the greater part of the collodion has flowed into the bottle, then the plate is raised more perpendicular, and gently rocked sideways, so as to prevent parallel lines forming in the direction of the corner from which it was flowed, which it would do if precautions were not taken to prevent it.

If the collodion is flowed from the plate too quickly, it will be too thick on the bottom of the plate, and if the rocking of the plate is not commenced before the collodion has begun to set, the parallel lines will show in spite of all the subsequent rocking. In drying, however, it will about all disappear.

If the plate is properly coated, it will have an even layer of collodion all over the surface, and will not be at all "streaky," but on the contrary very smooth.

Flow close to the edges and corners of the plate, being careful that it does not run over the sides. Do not remove the collodion which

may be a little thick along the sides nearest the corner at which it was poured off, as it will be a great aid in keeping the collodion from "peeling off."

Keep gently rocking the plate until the collodion is thoroughly set, which is easily determined by placing the finger *gently* at the corner from which it was poured off, and if the collodion does not adhere, but leaves a mark of the impression of the finger, then you may know that the film is set.

FUMING.

The plate, while still *moist*, is to be fumed. This can be done in the ordinary fuming-box. Hang up the plate by one of its corners to a spring nipper, and place three or four drachms of the strongest aqua ammonia in a saucer, which saucer is placed under the plate, on the bottom of the box. Fume from *two* to *three* minutes, and no more, and then the plate is ready to be removed.

DRYING.

This should be done by gentle heat. The plate should be stood up, by support of a side of the negative oven, on one of its corners, and the door is closed. This oven should be heated with a tiny jet of gas which is capital for the purpose.

When the plate is dry, which it will be in a very few minutes, then remove it immediately, and set it away in a cool place until it cools.

If the plate is permitted to get too hot, then the heat will cook the albumen, also collodion, and it will cause the film to be ruined before you have even commenced to print on it, turning it to a very yellow color. Watch the plate while it is in the oven, so that you will not forget it and have the above-named ruinous results occur. It would perhaps be better for the beginner to hold the *back* of the plate for a minute or so in front of the door of a hot stove, if he cannot dry it in the oven without forgetting and thus baking it. Baking may be a good thing for "the staff of life," but it is not particularly so for collodionized porcelain plates.

Do not take hold of the plate, if it should happen to be very hot, either with wet, damp, or very cold fingers, as the plate will be liable to break.

CHAPTER VI.

PORCELAIN PRINTING-BOARDS.

FOR the purpose of printing the porcelain successfully, different printing-boards have been invented, which are constructed in a different style from the ordinary negative-boards or frames.

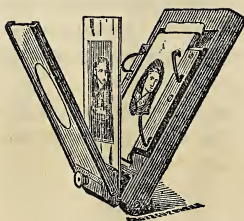
Those which are now generally used are known by the name of "Jacoby's Porcelain Printing-Frames." Use them, viz. :

First it is necessary that a good sharp negative is had, then loosen the thumb-screw on the hinged clamp at the bottom of the frame, place the negative in the clamp so as to rest on the wood at the sides of the padded bed, then fasten by the thumb-screw so as to not move out of position. The strips that rest on the edge of the negative at the sides are for vignetting the picture. Cut a piece of cardboard the size that will slip in the small grooves, with a hole in the size you want.

After placing the negative as above, take a piece of strong paper and put it in the clamp as before, then put some mucilage or wax in the centre, lay your porcelain plate in the position you want it, then throw the wire loops toward each other. This will make room for the plate between the bed and the negative. If it does not fill up the space, the four set-screws at the back of the frame will make it vary just to fit ; then print as in any other way.

In printing the porcelain photograph care should be used not to print too long when separated, and that the space should not be too much. For heads one inch in size the space should be about one-twelfth or one-sixteenth inch, and less for small ones. Three inch heads should be three and one-sixteenth or one-quarter inch, and in all cases the negative must rest on the wood at the sides of the frame ; for when you would separate the negative, the negative would follow the bed, and not give any space, and, of course, spoil the picture. Printing should always be done in the shade or under tissue-paper.

FIG. 51.



The "Jacoby Frames" are excellent in all of their parts, being so made as to secure perfect contact between the negative and porcelain, however uneven they both may be.

CHAPTER VII.

PLACING THE SENSITIVE PLATE ON THE BOARD FOR PRINTING.

I WILL only describe how the plate and negative are arranged for printing on one kind of board, viz. : "Jacoby's Porcelain Printing-Frame."

First darken the room by pulling down the curtains, and take the printing-board to the darkest part of the room, away from the window, but not in such a dark place that you will experience any difficulty in seeing.

Loosen the screw which loosens the narrow strip of wood, as seen in the printing-frame (Fig. 51). Place the edge of the porcelain plate under this strip of wood, being sure that the collodionized side is uppermost, and fasten the wood to it by the same screw. The porcelain plate will then be held firmly.

If the plate is a smaller one than is really intended for the size-frame which you may have, as a $\frac{1}{2}$ size plate, and you may not have but this one 8x10 board, you cannot place the edge of one of the sides of the porcelain under the bar, because then you cannot manage the negative so that the porcelain can be advantageously printed.

In that case fasten the negative to the frame, as will presently be shown, and place the porcelain plate at the place you wish it, *i. e.*, as near as you can at present tell, and hold the negative over the plate by means of the woodwork, at about a half inch from it, and move the porcelain so that it will occupy the exact place you wish it to, and then lay back the negative carefully, so as not to move the porcelain in doing so. Now obtain some beeswax, and place a bit on the board close to all of the sides of, but pressed against, the porcelain. Hold the porcelain firmly by the opposite side whenever you press on a particular side, and you will prevent it from being moved. In placing this wax there be sure that you get none of it on the *face* of the porcelain, nor should you allow the wax to remain above the *level* of the surface of the plate, but considerably below it, for you must remember that the *face* of the negative is coming into *close contact* with the porcelain, and if the above is not strictly followed out the porcelain will not only *move* when you raise the negative, but *the negative will be spoiled*.

The negative is then fastened in a slit made in the bar provided in the printing-frame. This bar is easily turned back when it is required by means of a hinge, and the level of it is raised higher or let down lower, as you may require for the purpose of bringing the negative and porcelain in close contact. This is aided by another bar which is held in position by thumb-screws whenever it is finally fixed in its proper position.

When you are ready to place the negative in the frame first loosen the screws, place the negative in the place intended for it in the bar, tighten the screws, and lay it on to the porcelain, and it will then assume its proper place, when it is pressed in contact by the hand. Now fasten the screws, and be sure that they are tightened during all the printing. The springs are then placed on to the negative, and the porcelain is ready for printing.

To examine the print move the clamp springs, and raise the negative by the bar, and *not* by taking hold of the negative itself.

Further directions are given by Mr. Jacoby with each frame. Scovill Manufacturing Co. make them, and all dealers sell them.

CHAPTER VIII.

PRINTING VIGNETTE PORCELAINS.

FOR the purpose of printing a vignette porcelain a block is made similar to those which have been described in Part I. The block should have a pasteboard fastened to it, upon which the clamping springs of the porcelain board can be fastened, which will then, besides keeping the porcelain and the negative in close contact, also hold the vignette-block in its place.

The same attention is required in vignetting porcelains as is necessary in printing positives on paper; so choose a suitable vignette-block, and cover it with tissue-paper before placing the porcelain out to print.

In case the background is a poor one it should be taken out, as has been explained in Part II, Chapter VI, the only difference between the two being, in one the print is on paper, whereas here it is on porcelain.

I have very often taken out faulty backgrounds, and have printed in fine ones, and the result has often been very satisfactory to me, for they looked very fine, and also as if it was the original background.

When the high-lights of the face of the printed porcelain are too blanky they should be toned down by exposure to the light for a couple of seconds or so, which is best done by obtaining a suitable piece of a dark or opaque paper, and, tearing a piece out of it, leaving a hole which should be full as large as the place to be tinted. (See Fig. 34.) Hold it out in the light, and keep the paper in constant motion while there, so that there will not be any harsh edges.

CHAPTER IX.

PRINTING MEDALLION PORCELAINS.

PERHAPS some of my readers will say that this style of porcelain picture is never printed, but allow me to say to the contrary, for I have very often seen very good results obtained with this style of printing, and which, on account of their novelty, was very pleasing.

When you have an old negative, and there is a porcelain wanted from it, then it can sometimes be printed in a medallion very nicely, especially when the draperies are very black, and the background is also very dark, both of which are very troublesome in vignetting to obtain fine feathering to the halos.

These medallion porcelain prints look very pretty when the porcelain to be printed is to be of a small size, as a $\frac{1}{4}$ size plate, but for anything larger than that size we do not like them at all.

When the medallion style of porcelain printing is made it should be put up in a square opening, either in the now fashionable gilt easel, or in the more sober-looking passepartout.

To print these porcelains in the medallion style you should follow out all of the particulars that have been fully explained in a chapter devoted to that in Part I, viz., Medallion and Arch-Top Printing. Place the right side of the mask (background) at its proper place on the face of the negative, and then place the porcelain out to the diffused rays of the sunlight to print. Now print the crescent line on it, as you would do with a paper print. Do not tint the outside very dark, a neutral shade between the background and the shaded crescent line being about right.

In placing the mask on the porcelain to shade the line be *very careful* that you do not scratch the film, for it is very tender.

CHAPTER X.

WASHING THE PORCELAINS.

THE porcelain when printed, and the high-lights tinted a trifle (*if they need it*), is then ready to be washed and toned, which had better be done as soon as printed.

Take the porcelain and go into the toning-room and arrange the light so that it will not be too strong, and whatever further operations you may do to the porcelain, before you are through with it, should be done away from the window, especially in the toning of it, as will be presently shown. Now take a four-ounce vial, partly filled with good alcohol (not necessarily 95 per cent.), and *before you wash the porcelain a particle with water* you should flow the contents of this vial over the prints, say half a dozen times, or until the print has turned a beautiful red color, which it will do in a very few minutes.

In pouring the alcohol on the plate, *do not pour it always on one place, but at a different one each time*, and be sure that the alcohol flows over all parts of the porcelain plate at the first flow, or else a harsh edge will be the result, which sometimes does not disappear in the final washings either with the alcohol or the water, although it may be said that this occurs very seldom. Do not keep pouring on the alcohol until the porcelain has turned a yellowish-red color, for this is very objectionable, and you may set it down as a rule when this color appears, then the strength of the print is fast disappearing.

When the print has turned a rich and warm color, which, if it has not been fumed too long, it will do in fifteen to twenty-five seconds, the plate is ready to be washed tolerably well under a tap of rain-water.

At first the film will repel the water, owing to its being soaked with alcohol, but in a couple of minutes or so the water will run smoothly over it. In the winter the plate had better be washed with lukewarm (no warmer) water, and never think of such a thing (*much less acting upon it*) as washing the porcelain with *ice-cold* water.

In placing the plate under the tap to wash, do not permit too large a stream of water to flow on it, for you must remember that the film will be more likely to slide off the plate if the water should manage to get a little under a corner with a large and heavy stream than it

would with a small one. Do not let the water fall all of the time at one place on the plate, but move it so that it will fall at different parts of the plate, and as this washing does not require more than four or five minutes at the most, the beginner had better hold the plate in his hand during the whole time of washing, as the result will probably be better.

A good way to tell when the plate is sufficiently washed is to taste a drop or two of the water which has drained *last* from the plate, after it is removed from the flow of the pipe, and also after the plate has washed awhile, and if you do not taste any of the silver, you can conclude that the plate is washed plenty.

An acetic acid wash, for the porcelains, is not a very good thing compared with alcohol, as a trial of the two will prove.

CHAPTER XI.

TONING THE PORCELAIN.

MAKE up, while your porcelain is printing, a toning solution as recommended below, so that it will have a chance to ripen before it is required.

The toning solution for porcelains, as well as for prints, should have a chance to get ripe before it is used, and it should therefore be made up at least fifteen or twenty minutes before it is wanted. Take a clean six-ounce wide-mouth vial and let fall about fifteen drops of a stock solution of chloride of gold into it, said stock solution being one grain of gold to the ounce of water. Place in it a piece of litmus-paper, which will turn red, and add drop by drop of a saturated solution of bicarbonate of soda to it until the paper will turn a little blue, shaking the bottle in the meantime. Now add about four ounces of filtered rain-water, and shake well.

Cover it up with a piece of glass, and let it stand for about five minutes in the sunlight, and then place it in the toning-room until ready for use. In winter, and often in the summer, it is an excellent plan to slightly warm the toning solution, and allow it to cool to a lukewarm state. The object of this is to make it tone more quickly, and also better than it would with a cold toning solution.

I have advised to make the toning solution in a bottle for the purpose of "toning by hand," but I should advise the beginner to make up the solution in a dish, for instance, a quarter size, and tone in that.

If you tone by hand never pour the solution twice on the same place, but at different places, and these places should be in the *shadows*, and not in the face, for uneven toning will often be the result, the high-lights and half-tints toning a little quicker where it is poured on a number of times than it does elsewhere; on the whole, it is better not to pour it on the printed picture at all, but on various parts of the *margin* of the porcelain, providing it can be so done.

In toning the porcelain in a dish, keep it constantly under the surface of the solution, and keep a slight motion to the toning solution constantly.

The light for toning is a matter of considerable importance, *for this, and this alone*, is in by far the majority of cases *the sole cause of overtoning*, because we tone our porcelains to what we think to be the right tint, toning in a *strong* light, and consequently when the porcelain is fixed we find that "it is overtoned."

You should tone in a *weak* light, and only until the high-lights and half-tints of the face *commence to look a trifle blue*, at which time the porcelain is toned, and the solution is to be washed immediately off.

If you were to examine a porcelain, as toned in a weak light, in a very much stronger one, it will appear to be undertoned, but it is not, and the beginner will do well to remember that a porcelain cannot be toned as much as you would a paper print, for it would be very much overtoned.

Considerable experience is required to tone them properly, and "to keep your hand in" you should make them frequently.

CHAPTER XII.

FIXING THE PORCELAIN.

THE porcelain, when toned, and the toning washed off the plate, is then to be fixed as you would do with a paper print, viz., with a weak solution of hyposulphite of soda.

The strength of the hypo is generally weaker than is used for fixing paper prints, and a little thinking by the beginner will enable him at once to see that it is not required to be as strong.

In the case of the paper print, the silver often sinks far into the

albumen, and when the paper has been floated too long a time, say four or five minutes, as has been recommended by some, the silver often sinks through, and into the bibulous paper beneath the albumen.

When a paper print is placed in the fixing bath, a stronger solution is required than what would suffice for the fixing of a porcelain, because it has got to penetrate through the mere surface of the albumen, and far into it on one side; and through the back of the paper to the albumen, and also a little into that on the other, and there do its work, which it will thoroughly do if the prints are moved about sufficiently, and are permitted to remain in the bath long enough. It is not an easy thing for the hypo solution to penetrate into the albumen anyhow, but it is done much better with a *weak* solution and a longer time of fixing, than it is with a *strong* solution and a shorter time for fixing. The albumen is a substance that is not the easiest thing in the world to wet with water, yet if the temperature of the water is *bloodwarm* it will, in a short time, penetrate quite a way into the paper, at least as far as the silver solution penetrated during the sensitizing of it.

Now, in the case of the porcelain print, all of the penetrating of the solution is done on one side of the porcelain, and through something that is more easily penetrated through than what albumen is, and a considerably weaker solution is used in this case, as has before been said; and as regards the tone, it is much better than it would be if a stronger solution than what is recommended below were to be used.

You might say that we can use a stronger solution and fix quicker, *but as sure as you do it the tone will be spoiled, and bleaching will be the result.*

Make up the bath as follows:

Sat. Sol. Hyposulphite of Soda,		1 ounce.
Clean Rain-water,		12 ounces.
Sat. Sol. Bicarbonate of Soda,		$\frac{1}{2}$ ounce.

Fix in a *weak light*, but not quite so weak as was recommended in the *toning*; fix five minutes, or until the face of the porcelain turns clear in tone, after the hypo has once turned it cloudy, which it will do the moment the print is placed in the bath.

The porcelain print undergoes a variety of changes in the fixing bath, often immediately turning a peculiar green, as disagreeable in looks as it is peculiar, and the longer the plate is kept in the bath the worse it seems to look.

Then again it turns yellow, and stays so too, which is often a sure

sign of undertoning, and if it turns slate-blue or a forced brown color, then this is often a sure sign of overtoning. There are, however, a number of things to take into consideration, which will be treated of in Chapter XVI.

To tell when a porcelain is fixed you should permit it to remain in the fixing bath until the tone to which you have toned it returns, and then if, on close examination, the face is seen to be clear, then the plate is fixed; if it is not clear, let it remain in the bath until it is.

CHAPTER XIII.

FINAL WASHING OF THE PORCELAIN.

THE porcelain when fixed is then to receive the final washing, which will render the plate free from any destroying agent that will cause the print to fade, at least so far as anything besides the plate itself is concerned.

For the first few minutes the plate is carefully washed on both sides under the tap. Rub the back of the plate with one hand, holding it with the other, and permitting the water from the tap to fall not too heavy on the face of it.

Set the plate under the tap (say, for instance, on one end of an empty salt-box), and let a steady stream of water fall upon it, moving it at times, so that the water will fall at a different place every five minutes.

After the plate has washed half an hour or so, then soaking the plate in a salt-water bath, made as below given, is an excellent thing.

Lukewarm Water, ...	1 gallon.
Chloride of Sodium (table salt), ...	2 ounces.

This warm salt-water bath will enter right into the film, and displace within five minutes all of the hypo that is left in the film, after the washing just described.

Let the plate remain in this bath five or ten minutes, and then soak it in two more lukewarm water baths, but let these baths be of *fresh* water. Give the plate a quick final washing under the tap, and rinse well.

During the first washing of the plate, the tone of the print often changes, which will be fully entered into in Chapter XVI, Part III.

CHAPTER XIV.

DRYING AND TINTING THE PORCELAIN.

DRYING.

THE plate can either be dried spontaneously, or by artificial heat, as the printer chooses. Each of these is best at times, as any one who has ever printed porcelain pictures knows.

Drying by heat makes the tone *bluer* than it would be if it were allowed to dry without. Then, again, if the porcelain is to be dried by heat, place it in the negative oven, permitting it to dry gently. Before placing it in, however, wipe out the oven with a damp cloth; and in drying spontaneously, hang up the plate upon two nails away from draughts, which may cause dust to settle upon it.

TINTING.

In tinting the cheeks and lips, you can either do it with a flesh wash, or by dry color. The latter is sometimes applied to the cheeks and lips of the porcelain print after the plate is varnished, because in varnishing the plate, after the dry color is applied to it, it sometimes comes off during the flowing of the varnish back into the bottle.

If the plate is not warmed before you flow the varnish on it, and is dried up quickly, the color will not disappear; but if it is warmed before varnishing, it will surely disappear.

Proof: Experience in varnishing by both methods.

The object in first warming the plate before varnishing is to prevent it from getting chilled in drying, but unless it is very cold indeed, the varnishing and drying quickly in a hot oven will place a splendid gloss on the plate.

In spotting, mix the color to the proper tone, being sure that you also have gum arabic in it *in abundance*.

A most excellent hit is to color the hair of the porcelain print if the print is that of a blonde—either before or after varnishing, as may suit the printer—with a little of *dry yellow color*, and the effect will be splendid.

CHAPTER XV.

VARNISHING THE PORCELAIN.

THE porcelain when tinted, spotted, and the high-lights placed in the eyes if necessary, is then to receive a coat of varnish, which will in a great measure protect the film from injury.

White shellac varnish is necessary for this, because the common yellow lac will spoil the pure white of the porcelain.*

To make this varnish, first obtain three-quarters of a pound of good white shellac, and place it in a large wide-mouth bottle, in which there has been placed two quarts of the best alcohol. If you are in a hurry for this varnish, you should, previous to placing it in the bottle, break up the shellac in small pieces, placing it, say in a clean rag, and pounding it with a hammer, or break it in a mortar with a pestle. Shake the bottle until the shellac is dissolved, and if you should see a sediment on the bottom that will not dissolve, you need not be apprehensive of bad results, because it does not all dissolve, for this is only the impurities in the shellac, and can be filtered out.

As the beginner can probably flow better from a small bottle than he can from a large one, I should advise the use of a common collodion vial, which will hold about six ounces, and which should be cleaned thoroughly both on the outside and inside. Into this vial, filter through a couple of filtering-papers sufficient of the varnish to fill it up, and you will find the liquid to be of a pale golden color.

In selecting the bottle, choose one that has a good lip to it, so that when you varnish the plate you can do so without "daubing up" the bottle.

Keep the outside of your bottle perfectly free from varnish, and try to keep your varnish-bottle clean, so that it will look well, and always keep it covered when not in use, by laying a piece of glass over it, or better still, a ground-glass stopper if the bottle has a neck made for it, but do not stop up the bottle with a cork, as it will in a short time leave bits of it in the varnish. Use a *cometless collodion vial* if you can.

When about to varnish, hold the plate for a second or so near the fire, for no other purpose than to take the chill from the plate, which you can do without really warming it, for if you were to do that, the varnishing, as before said, would remove the tinting of the por-

* This varnish can very nicely be used in the varnishing of intense negatives.

celain, but if it were only kept near enough to the stove to prevent the plate from being so cold as to chill the varnish the moment it is poured on, it will not then remove the tinting at all.

Avoid getting the plate hot before you varnish it, for you will almost inevitably make a "botch" of it, unless you have had years of experience in varnishing. The varnish, at this time, will also totally remove the tinting and coloring of the hair, although it will not affect the spotting, &c.

Before you commence to varnish, shut the oven door and turn up the gas flame, thus allowing the oven to heat up while you are flowing the plate, so that you can place the plate in it, and dry it quickly, which will prevent the varnish from chilling on the plate, before you have obtained heat enough to dry it. Pour the varnish on the plate in the same manner as I have twice before described, once in the albumenizing, and the other in the collodionizing. Pour the varnish back from the plate into another bottle, and before using it again always filter it.

Pour on the varnish so that you can permit it to run off that corner which is furthest away from the print, because the varnish forms a slight ridge on the two sides, whose vertex is that corner from which your varnish was poured from the plate.

Place the freshly varnished plate in the hot oven, resting it on *one* corner, and that corner *invariably* the one at which the varnish was poured off.

Too much varnish on the plate will cause a much larger ridge on the sides than if there was only about the right quantity poured on it in the first place, unless you are very careful in pouring it from the plate.

Wipe out the oven every time you are about ready to varnish a plate, *and just as soon as the plate is dry, remove it*, and place it in a cool (*not too cool*) place, which place should be perfectly free from all traces of dust.

CHAPTER XVI.

CAUSES OF FAILURES IN PORCELAIN PRINTING.

MANIPULATION.

PROPER manipulation is the great secret of success in photography, and without it we cannot hope to succeed.

What is it that lies at the foundation of successful manipulation?

It is care! and as we are proportionally careful in manipulating, so shall our success be.

The beginner is very apt, unless he is continually on his guard, to get careless in his manipulation, and in hopes to benefit such a one, I will here give a brief notice, wherein the careful man succeeds far better than a careless one.

I have known a careless toner, when toning a porcelain, to drop a couple of drops or so of the chloride of gold solution into the dish where the porcelain was toning, and instead of placing it in a corner of the dish away from any part of the plate, what worse thing could he do than to drop it in the middle of the dish, where, before he could stop it toning more rapidly at that place, by repeated shakings of the dish, it had toned a place full an inch in diameter before it had got so mixed with the rest of the solution, that it would not tone so rapidly, and the *bright* (?) toner would have a chance to shake the contents of his dish well? But it was too late; the toning of the porcelain print needs to be carried no further.

A careful man would have taken the porcelain print out of the dish before he added the gold, and when it was well mixed, he would have placed it back again.

A careless man would not have taken measures to prevent dust from settling on his plate either during the albumenizing, collodionizing, or the varnishing of the porcelain plate, which a careful one would certainly have done, and can he hope that his results would have been as fine as his competitors?

Such is a little of the vast difference between a careful and a careless manipulator, and still the latter will continue to say, and often really to believe, that the reason why Mr. — does better work than what he does, is on account of some secret formulæ, &c., &c.

Reader, you and I know better.

THE PLATES.

It is sometimes a most difficult thing to obtain good plates, on account of the unevenness of the glass, it often being so wavy as to render it useless for good work.

Then again the plates sometimes have a rough surface, and are so frail that you are continually expecting them to break.

When the photographer does not have any glass on hand, except this poor quality, he is obliged to use that, until he can obtain some better. I use the poor glass up in printing the beautiful imitation porcelain, viz., "Lamson's Photo. Porcelain."*

* I do not wish my readers to think that the above is an advertisement for the sale of the "Photo. Porcelain," for that is not so.

CLEANING OF THE PLATES.

There will be no difficulty at all in getting the plates thoroughly cleaned, if the advice is followed strictly out which has been given in Chapter II.

ALBUMENIZING.

The film peeling off during the subsequent operations of the plate after it is printed, is due to the albumen solution being too thin, or the plate not being wholly covered by the albumen during the albumenizing. Roughen the edges of the plates before albumenizing, by scraping them together, and flow with thick albumen.

Dirty plates are caused, either by using plates before they are thoroughly clean, or by dirt in the albumen solution caused by imperfect filtration, or by dust settling on them before they had dried, all of which will cause plates to be more or less dirty.

COLLODIO-CHLORIDE.

This is a very delicate collodion, and it should always be made and kept in the dark-room.

If the prints are blue and slaty in color, and you are sure that it is not caused by overfuming, doubtless it is caused by the collodion, and in that case, it is because there is not enough citric acid in the solution, for *this* is what gives the *tone* to the printing porcelain.

If the collodion prints flat, the chloride of silver in it is too weak, and you should make up another batch, containing a grain or so more of silver to each ounce of solution than what there may have been in the cast-away collodion.

Chloride of calcium in the proportion of 3.75 minims of the calcium solution (see Solution C, Chapter IV, Part III), is added to every grain of nitrate of silver there may have been placed in the collodion.

The beginner must remember that a minim is the same as an ordinary size drop, and in a solution of nitrate of silver 480 grains, and pure water 480 minims (one ounce), the silver is one grain strong to every minim of solution.

For the purpose of measuring out drops there is in the market a tiny graduate, which holds just one drachm. This graduate has the scale marked in minims, and thus if we wished to measure out 60 drops of a solution, all that we would have to do, is to fill the graduate up to the place marked 60 minims (which is one drachm), and besides being more sure in obtaining the exact quantity we

wished, it is not near so tedious as it would be to drop the required number one by one from the bottle.

Suppose we were to make up a bottle of collodio(n)-chloride which should just contain *four* ounces of plain collodion, and we were to add 32 drops of the silver solution named above. There would then be 32 grains of silver in the 4 ounces of plain collodion, which by the way is equal to 8 grains of nitrate of silver to each separate ounce of collodion. Now when we are about to add the chloride of calcium solution to the rest of it, we should add 3.75 minims to every grain of silver there was added to the collodion, which in this case was 32 grains, and $3.75 \text{ minims} \times 32 \text{ grains} = 120 \text{ minims}$, which is one-quarter of an ounce.

As a rule add of the citric acid, in the same quantity as you do the chloride of calcium, and the proportion would then be the same, providing the solutions are each 32 grains to the ounce of 95 per cent. alcohol.

If you were to make up a batch of *six* ounces of collodion, and as in the above case you would wish to make it 8 grains strong of silver to the ounce of collodion, you would then fill up the tiny graduate to the place which should indicate 48 drops.

In adding the chloride of calcium and the citric acid to the collodion, you should add of both $3.75 \text{ minims} \times 48 \text{ grains}$, which is 180 minims.

The apprentice will readily see by the perusal of the above, that he can make up a rule for the successful making of the collodio-chloride, providing in the case of the chloride and the citric acid, he were to make up a stock solution of each of these in the proportion, as has been before said, of 32 grains to the ounce of alcohol.

Thick collodion is caused by having used plain collodion which contained too much cotton, or by having left for a time the bottle of collodio-chloride uncorked.

Dirty collodion is caused by not having the bottle clean in which it was made, and then again by the use of dirty solutions, which have been used in the making of it. The chloride of calcium solution, if made in a small quantity, cannot be decanted, and will often have to be filtered before use. The dirt in the collodio-chloride solution rises to the top, and by pouring off the top of it, you can obtain clean collodion for use whenever you need it, although it had best be poured off *immediately* before you want it to use.

Yellow collodion is caused by age and heat, and occurs far more quickly during the heat of summer than what it does in the winter. This occurs more readily in collodion which is highly sensitized.

It would be a good plan to make up differently sensitized batches

of collodion, each of which should be plainly labelled as to the exact number of grains there is to each ounce of solution at the time of making it, so that when you are about to print a harsh or a flat negative, you can flow your plate with that collodion which is best fit for that particular negative, and the results will be better.

Yellowness of the film after drying is caused either by the plate being subjected to intense heat during drying, or by exposure to the light before toning.

PRINTING.

Double features are caused by the moving of the negative during printing; blurred prints by imperfect contact between the plate and negative; scratches by carelessness; harsh shadows by the negative not being "doctored" before printing as it ought to be: besides many other things which are called failures in this department.

WASHING.

Stains and scratches are caused by *accidents* (?) during the washing.

TONING.

Refusing to Tone.—This is caused by there not being enough gold in the solution; or the solution being too acid through neglect of placing sufficient bicarbonate of soda in it; and if this refusing to tone is accompanied by considerable bleaching, then the solution is surely acid, or it is not thoroughly ripe before it is used.

Uneven Toning.—This has a very bad look, on account of there being a variety of hues, stains, &c., often abounding in the print. This is caused by careless manipulation, and occurs more in the case of the beginner while "toning by hand" than in any other way.

FIXING.

Insufficient fixing will cause the plates to discolor quite rapidly after they are finished.

Sometimes when a porcelain print is placed in the fixing bath, it will immediately turn a very disagreeable-looking tone, and stay that tone in spite of your efforts towards bringing it back to its proper color. There are several reasons for this: first, the collodion may be too new; secondly, the hypo solution may be old; thirdly, the soda solution may be acid; and fourthly, the collodion may be too old: all of which will give the same result.

If the collodion is either too new or old, it is certain to show it in the fixing bath, in the former case turning green in color, and

in the latter, an ugly yellow tinge will be plainly visible to the fixed print. As to the hypo solution, never fix a plate in a bath that has ever had a single plate fixed in it—especially if the bath is more than a day old—and do not use a bath of hypo which is ice-cold, and just made up, but have it as warm as common rain-water is in the summer when pumped from the cistern, and allow the bath to be an hour or so old before use, as better results are obtained. Try it.

Keep the hypo bath always in the dark, more especially so after any plates have been fixed in it.

FINAL WASHING.

Insufficient washing will cause the plate to turn yellow in a short time after it is dried, and the picture will gradually bleach and fade, and within a year's time, the tone will be most disagreeable.

If the porcelain changes color during this washing, then the collodion is too new, and sometimes the water is impure, and to determine as to whether the latter is the cause, use a little distilled water for the first washing.

FADING OF THE PORCELAINS.

This is, in the majority of cases, due to the porcelain plate itself, and is owing to the substance which is used in the bleaching of the coloring matter in the plate being left in the plate, and which thus affects the print, destroying it in many cases as completely as it would be destroyed if the hypo was not well and thoroughly washed from it.

It is for this reason that some photographers will never make porcelains for their customers, without first telling them that they will not warrant them to last longer than a given specified time.

There are good plates, however, as well as poor ones, and I have very often known porcelains to keep for two to three years in good condition, and look then as though they were good for full as many more.

The fading is not wholly in the plate, however, for it is often in the fixing and final washing of it that they sometimes fade, on account of poor manipulation, besides various local causes which are impossible things to mention here, as there are different causes in every gallery. Always do your work as well as possible, and in ninety cases out of a hundred, the porcelain will keep in excellent condition for many years.

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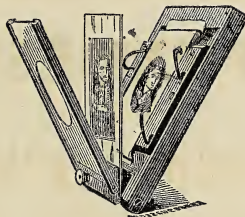
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PATENTED OCTOBER 14, 1873.



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4 $\frac{1}{4}$ x 6 $\frac{1}{2}$	65	90	11 x 14	2 25	2 75
4 x 7	70	1 00	13 x 16	3 00	3 50
4 x 8	70	1 00	14 x 17	3 75	
5 x 7	75	1 10	16 x 20	6 00	
5 x 8	75	1 10	17 x 21	6 25	
6 $\frac{1}{2}$ x 8 $\frac{1}{2}$	75	1 10	20 x 24	6 75	

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5 x 7 plate, each, ...	3 75	11 x 14 "	6 25
$6\frac{1}{2}$ x $8\frac{1}{2}$ "	4 25	14 x 17 "	7 50

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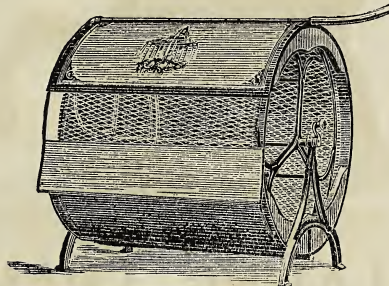
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Size Cylinder.	Capacity in Cards.	Largest Print.	Price.
Diam., 16 in., length, 14½ inches, . . .	84 . . .	14 x 17 in., . . .	\$30 00
" 20 " " 19 " . . .	144 . . .	18 x 22 " . . .	40 00
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Larger sizes may follow.

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Testimonials.

"I write to testify to the satisfaction I feel with the working of your Rapid Print Washer. It is simply perfection, as far as my experience with it goes, viz.: one year's constant use. I have washed eight dozen cartes in ten minutes, and the most accurate test I know of, starch and iodine, failed to show a trace of hypo. remaining."—L. G. BIGELOW, *Detroit, Mich.*, Feb. 10th, 1874.

"'Time saved is money earned.' The above maxim is as true in the photographic business as in any other, and in this connection I would say, that Moulton's Rapid Photo-Washer will save more time in any well-regulated gallery, than any mechanism ever yet invented; besides the prints finish with a finer lustre than those washed by any other device I have ever yet seen. Having used one for the past two months, washing from one hundred to three hundred prints daily, I am pleased to add my testimonial to its excellence."—WM. M. LOCKWOOD, *Ripon, Wis.*, March 11, 1874.

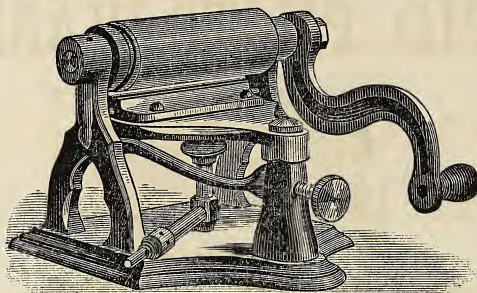
ANALYSIS OF PRINTS.

"After analyzing the prints which were washed by you during ten minutes, in your Rapid Photo-Washer, and those furnished by an artist of this city, washed in a syphon tank in running water for one hour and left in the water over night, for the quantity of hyposulphites left therein, I take pleasure in stating that the prints treated in the Rapid Photo-Washer contain perceptibly less hyposulphites than those washed in the other manner described."—GUSTAVUS BODE, Analytical Chemist, and Dealer in Photographic Stock, *Milwaukee, Wis.*, Feb. 21, 1874.

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and Dec. 2d, 1873.

OSCILLATING ENAMELER

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EVERY MACHINE WARRANTED PERFECT.

PRICE LIST.

Cabinet Size, 6 inch roll, . .	\$25 00	10 x 12 size, 14 inch roll, . .	\$50 00
4-4 " 10 " " . .	40 00	14 x 17 " 18 " " . .	75 00

THE Oscillating Enameler is constructed on scientific principles, and in the operation of burnishing, the roll and burnisher both move, giving a combined action on the face of the photograph, and producing a fine finish with a very light pressure, so that enameled mounts can be burnished as well as plain mounts. This fact alone makes the Enameler superior to all other machines for burnishing photographs. *The reasons why it is the best* :—the double action of roll and burnisher prevents the card from sticking on the burnisher; it also prevents the burnisher from scratching the albumen off the face of the picture and spoiling it, as is the case in similar machines. The oscillating motion of the burnisher feeds the card and keeps the burnisher polished. Equal pressure at both ends of the burnisher is another great advantage, which prevents the card from turning while in the operation of burnishing, as is the case in other machines. The mechanism of the pressure is certain and can be operated in an instant correctly. The removable burnisher is another great advantage, giving the photographer the opportunity of having several, so that if one becomes injured it can immediately be removed and replaced with another one, causing no delay. Each machine will be tested before being shipped.

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W. G. ENTREKIN,

Inventor and Patentee of Entrekin's Oscillating Enameler.

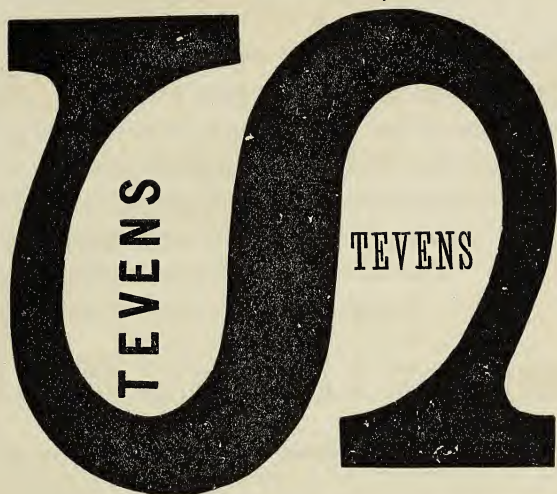
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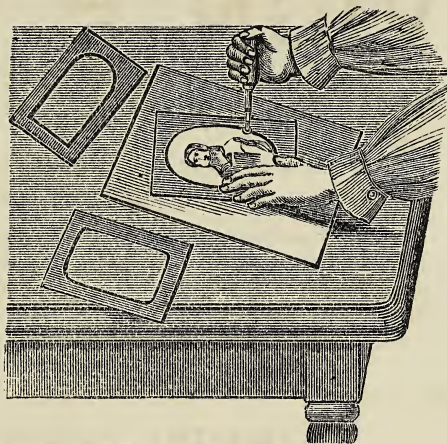
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